



OM-2221

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2008-01

## Processes



Submerged (SAW) Welding

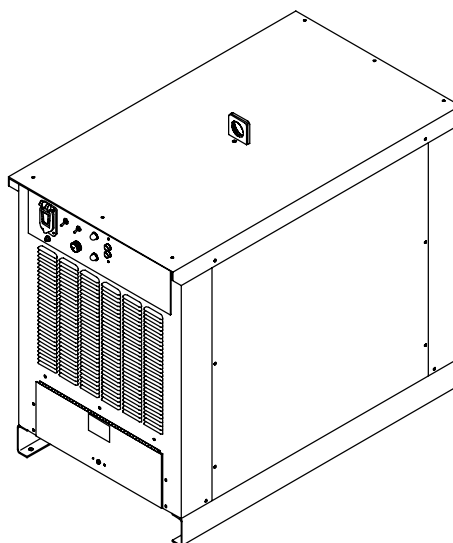
## Description



Arc Welding Power Source



# Summit Arc 1000/1250<sup>TM</sup>



Visit our website at  
[www.MillerWelds.com](http://www.MillerWelds.com)

## OWNER'S MANUAL

File: Submerged (SAW)



# From Miller to You

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*Thank you and congratulations* on choosing Miller. Now you can get the job done and get it done right. We know you don't have time to do it any other way.

That's why when Niels Miller first started building arc welders in 1929, he made sure his products offered long-lasting value and superior quality. Like you, his customers couldn't afford anything less. Miller products had to be more than the best they could be. They had to be the best you could buy.

Today, the people that build and sell Miller products continue the tradition. They're just as committed to providing equipment and service that meets the high standards of quality and value established in 1929.

This Owner's Manual is designed to help you get the most out of your Miller products. Please take time to read the Safety precautions. They will help you protect yourself against potential hazards on the worksite.



Miller is the first welding equipment manufacturer in the U.S.A. to be registered to the ISO 9001:2000 Quality System Standard.

We've made installation and operation quick and easy. With Miller you can count on years of reliable service with proper maintenance. And if for some reason the unit needs repair, there's a Troubleshooting section that will help you figure out what the problem is. The parts list will then help you to decide the exact part you may need to fix the problem. Warranty and service information for your particular model are also provided.



Miller Electric manufactures a full line of welders and welding related equipment. For information on other quality Miller products, contact your local Miller distributor to receive the latest full line catalog or individual specification sheets. **To locate your nearest distributor or service agency call 1-800-4-A-Miller, or visit us at [www.MillerWelds.com](http://www.MillerWelds.com) on the web.**



Working as hard as you do – every power source from Miller is backed by the most hassle-free warranty in the business.



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# Declaration of Conformity for European Community (CE) Products

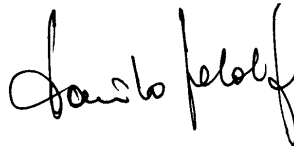
 This information is provided for units with CE certification (see rating label on unit).

## **Manufacturer:**

Miller Electric Mfg. Co.  
1635 W. Spencer St.  
Appleton, WI 54914 USA  
Phone: (920) 734-9821

## **European Contact:**

Mr. Danilo Fedolfi,  
Managing Director  
ITW Welding Products Italy S.r.l.  
Via Privata Iseo 6/E  
20098 San Giuliano  
Milanese, Italy  
Phone: 39(02)98290-1  
Fax: 39(02)98290203



European Contact Signature: \_\_\_\_\_

Declares that the product:

**Summit Arc™ 1000/1250**

conforms to the following Directives and Standards:

### **Directives**

*Low Voltage Directive: 72/23/EEC*

*Machinery Directives: 89/392/EEC, 91/368/EEC, 93/C 133/04, 93/68/EEC*

*Electromagnetic Compatibility Directives: 89/336, 92/31/EEC*

### **Standards**

*Safety Requirements for Arc Welding Equipment part 1: EN 60974-1: 1993*

*Arc Welding Equipment Part 1: Welding Power Sources: IEC 974-1  
(April 1995 – Draft revision)*

*Degrees of Protection provided by Enclosures (IP code): IEC 529: 1989*

*Insulation coordination for equipment within low-voltage systems:  
Part 1: Principles, requirements and tests: IEC 664-1: 1992*

*Electromagnetic compatibility (EMC) Product standard for arc welding equipment:  
EN50199: January 1997*

# SECTION 1 – SAFETY PRECAUTIONS - READ BEFORE USING

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 **Protect yourself and others from injury — read and follow these precautions.**

## 1-1. Symbol Usage



**DANGER!** – Indicates a hazardous situation which, if not avoided, will result in death or serious injury. The possible hazards are shown in the adjoining symbols or explained in the text.



Indicates a hazardous situation which, if not avoided, could result in death or serious injury. The possible hazards are shown in the adjoining symbols or explained in the text.

**NOTICE** – Indicates statements not related to personal injury.

 Indicates special instructions.



This group of symbols means Warning! Watch Out! ELECTRIC SHOCK, MOVING PARTS, and HOT PARTS hazards. Consult symbols and related instructions below for necessary actions to avoid the hazards.

## 1-2. Arc Welding Hazards



The symbols shown below are used throughout this manual to call attention to and identify possible hazards. When you see the symbol, watch out, and follow the related instructions to avoid the hazard. The safety information given below is only a summary of the more complete safety information found in the Safety Standards listed in Section 1-5. Read and follow all Safety Standards.



Only qualified persons should install, operate, maintain, and repair this unit.



During operation, keep everybody, especially children, away.



### ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

- Do not touch live electrical parts.
- Wear dry, hole-free insulating gloves and body protection.
- Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground.
- Do not use AC output in damp areas, if movement is confined, or if there is a danger of falling.
- Use AC output ONLY if required for the welding process.
- If AC output is required, use remote output control if present on unit.
- Additional safety precautions are required when any of the following electrically hazardous conditions are present: in damp locations or while wearing wet clothing; on metal structures such as floors, gratings, or scaffolds; when in cramped positions such as sitting, kneeling, or lying; or when there is a high risk of unavoidable or accidental contact with the workpiece or ground. For these conditions, use the following equipment in order presented: 1) a semiautomatic DC constant voltage (wire) welder, 2) a DC manual (stick) welder, or 3) an AC welder with reduced open-circuit voltage. In most situations, use of a DC, constant voltage wire welder is recommended. And, do not work alone!
- Disconnect input power or stop engine before installing or servicing this equipment. Lockout/tagout input power according to OSHA 29 CFR 1910.147 (see Safety Standards).
- Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.

- Always verify the supply ground – check and be sure that input power cord ground wire is properly connected to ground terminal in disconnect box or that cord plug is connected to a properly grounded receptacle outlet.
- When making input connections, attach proper grounding conductor first – double-check connections.
- Keep cords dry, free of oil and grease, and protected from hot metal and sparks.
- Frequently inspect input power cord for damage or bare wiring – replace cord immediately if damaged – bare wiring can kill.
- Turn off all equipment when not in use.
- Do not use worn, damaged, undersized, or poorly spliced cables.
- Do not drape cables over your body.
- If earth grounding of the workpiece is required, ground it directly with a separate cable.
- Do not touch electrode if you are in contact with the work, ground, or another electrode from a different machine.
- Do not touch electrode holders connected to two welding machines at the same time since double open-circuit voltage will be present.
- Use only well-maintained equipment. Repair or replace damaged parts at once. Maintain unit according to manual.
- Wear a safety harness if working above floor level.
- Keep all panels and covers securely in place.
- Clamp work cable with good metal-to-metal contact to workpiece or worktable as near the weld as practical.
- Insulate work clamp when not connected to workpiece to prevent contact with any metal object.
- Do not connect more than one electrode or work cable to any single weld output terminal.

### SIGNIFICANT DC VOLTAGE exists in inverter-type welding power sources after removal of input power.

- Turn Off inverter, disconnect input power, and discharge input capacitors according to instructions in Maintenance Section before touching any parts.



### HOT PARTS can cause severe burns.

- Do not touch hot parts bare handed.
- Allow cooling period before working on gun or torch.
- To handle hot parts, use proper tools and/or wear heavy, insulated welding gloves and clothing to prevent burns.



## FUMES AND GASES can be hazardous.

Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

- Keep your head out of the fumes. Do not breathe the fumes.
- If inside, ventilate the area and/or use local forced ventilation at the arc to remove welding fumes and gases.
- If ventilation is poor, wear an approved air-supplied respirator.
- Read and understand the Material Safety Data Sheets (MSDSs) and the manufacturer's instructions for metals, consumables, coatings, cleaners, and degreasers.
- Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Always have a trained watch-person nearby. Welding fumes and gases can displace air and lower the oxygen level causing injury or death. Be sure the breathing air is safe.
- Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
- Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.



## ARC RAYS can burn eyes and skin.

Arc rays from the welding process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin. Sparks fly off from the weld.

- Wear an approved welding helmet fitted with a proper shade of filter lenses to protect your face and eyes when welding or watching (see ANSI Z49.1 and Z87.1 listed in Safety Standards).
- Wear approved safety glasses with side shields under your helmet.
- Use protective screens or barriers to protect others from flash, glare and sparks; warn others not to watch the arc.
- Wear protective clothing made from durable, flame-resistant material (leather, heavy cotton, or wool) and foot protection.

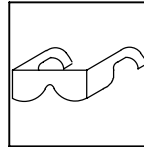


## WELDING can cause fire or explosion.

Welding on closed containers, such as tanks, drums, or pipes, can cause them to blow up. Sparks can fly off from the welding arc. The flying sparks, hot workpiece, and hot equipment can cause fires and burns. Accidental contact of electrode to metal objects can cause sparks, explosion, overheating, or fire. Check and be sure the area is safe before doing any welding.

- Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
- Do not weld where flying sparks can strike flammable material.
- Protect yourself and others from flying sparks and hot metal.
- Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
- Watch for fire, and keep a fire extinguisher nearby.
- Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
- Do not weld on closed containers such as tanks, drums, or pipes, unless they are properly prepared according to AWS F4.1 (see Safety Standards).
- Do not weld where the atmosphere may contain flammable dust, gas, or liquid vapors (such as gasoline).
- Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock, sparks, and fire hazards.

- Do not use welder to thaw frozen pipes.
- Remove stick electrode from holder or cut off welding wire at contact tip when not in use.
- Wear oil-free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.
- Remove any combustibles, such as a butane lighter or matches, from your person before doing any welding.
- After completion of work, inspect area to ensure it is free of sparks, glowing embers, and flames.
- Use only correct fuses or circuit breakers. Do not oversize or bypass them.
- Follow requirements in OSHA 1910.252 (a) (2) (iv) and NFPA 51B for hot work and have a fire watcher and extinguisher nearby.



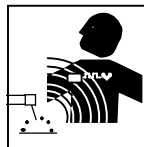
## FLYING METAL or DIRT can injure eyes.

- Welding, chipping, wire brushing, and grinding cause sparks and flying metal. As welds cool, they can throw off slag.
- Wear approved safety glasses with side shields even under your welding helmet.



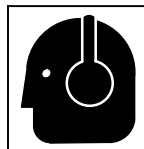
## BUILDUP OF GAS can injure or kill.

- Shut off shielding gas supply when not in use.
- Always ventilate confined spaces or use approved air-supplied respirator.



## MAGNETIC FIELDS can affect Implanted Medical Devices.

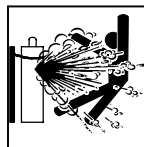
- Wearers of Pacemakers and other Implanted Medical Devices should keep away.
- Implanted Medical Device wearers should consult their doctor and the device manufacturer before going near arc welding, spot welding, gouging, plasma arc cutting, or induction heating operations.



## NOISE can damage hearing.

Noise from some processes or equipment can damage hearing.

- Wear approved ear protection if noise level is high.



## CYLINDERS can explode if damaged.

Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

- Protect compressed gas cylinders from excessive heat, mechanical shocks, physical damage, slag, open flames, sparks, and arcs.
- Install cylinders in an upright position by securing to a stationary support or cylinder rack to prevent falling or tipping.
- Keep cylinders away from any welding or other electrical circuits.
- Never drape a welding torch over a gas cylinder.
- Never allow a welding electrode to touch any cylinder.
- Never weld on a pressurized cylinder – explosion will result.
- Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
- Turn face away from valve outlet when opening cylinder valve.
- Keep protective cap in place over valve except when cylinder is in use or connected for use.
- Use the right equipment, correct procedures, and sufficient number of persons to lift and move cylinders.
- Read and follow instructions on compressed gas cylinders, associated equipment, and Compressed Gas Association (CGA) publication P-1 listed in Safety Standards.

### 1-3. Additional Symbols For Installation, Operation, And Maintenance



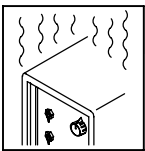
#### **FIRE OR EXPLOSION hazard.**

- Do not install or place unit on, over, or near combustible surfaces.
- Do not install unit near flammables.
- Do not overload building wiring – be sure power supply system is properly sized, rated, and protected to handle this unit.



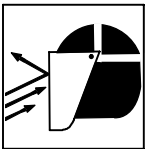
#### **FALLING UNIT can cause injury.**

- Use lifting eye to lift unit only, NOT running gear, gas cylinders, or any other accessories.
- Use equipment of adequate capacity to lift and support unit.
- If using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of unit.



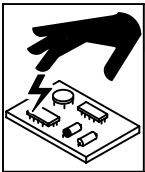
#### **OVERUSE can cause OVERHEATING**

- Allow cooling period; follow rated duty cycle.
- Reduce current or reduce duty cycle before starting to weld again.
- Do not block or filter airflow to unit.



#### **FLYING SPARKS can cause injury.**

- Wear a face shield to protect eyes and face.
- Shape tungsten electrode only on grinder with proper guards in a safe location wearing proper face, hand, and body protection.
- Sparks can cause fires — keep flammables away.



#### **STATIC (ESD) can damage PC boards.**

- Put on grounded wrist strap BEFORE handling boards or parts.
- Use proper static-proof bags and boxes to store, move, or ship PC boards.



#### **MOVING PARTS can cause injury.**

- Keep away from moving parts.
- Keep away from pinch points such as drive rolls.



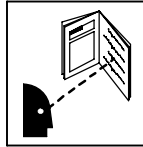
#### **WELDING WIRE can cause injury.**

- Do not press gun trigger until instructed to do so.
- Do not point gun toward any part of the body, other people, or any metal when threading welding wire.



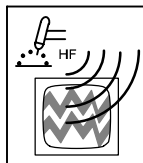
#### **MOVING PARTS can cause injury.**

- Keep away from moving parts such as fans.
- Keep all doors, panels, covers, and guards closed and securely in place.
- Have only qualified persons remove doors, panels, covers, or guards for maintenance as necessary.
- Reinstall doors, panels, covers, or guards when maintenance is finished and before reconnecting input power.



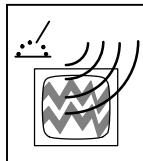
#### **READ INSTRUCTIONS.**

- Read Owner's Manual before using or servicing unit.
- Use only genuine replacement parts from the manufacturer.



#### **H.F. RADIATION can cause interference.**


- High-frequency (H.F.) can interfere with radio navigation, safety services, computers, and communications equipment.
- Have only qualified persons familiar with electronic equipment perform this installation.
- The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation.
- If notified by the FCC about interference, stop using the equipment at once.
- Have the installation regularly checked and maintained.
- Keep high-frequency source doors and panels tightly shut, keep spark gaps at correct setting, and use grounding and shielding to minimize the possibility of interference.




#### **ARC WELDING can cause interference.**


- Electromagnetic energy can interfere with sensitive electronic equipment such as computers and computer-driven equipment such as robots.
- Be sure all equipment in the welding area is electromagnetically compatible.
- To reduce possible interference, keep weld cables as short as possible, close together, and down low, such as on the floor.
- Locate welding operation 100 meters from any sensitive electronic equipment.
- Be sure this welding machine is installed and grounded according to this manual.
- If interference still occurs, the user must take extra measures such as moving the welding machine, using shielded cables, using line filters, or shielding the work area.

## 1-4. California Proposition 65 Warnings


 Welding or cutting equipment produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)

 Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling.

For Gasoline Engines:

 Engine exhaust contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

For Diesel Engines:

 Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

## 1-5. Principal Safety Standards

*Safety in Welding, Cutting, and Allied Processes*, ANSI Standard Z49.1, from Global Engineering Documents (phone: 1-877-413-5184, website: [www.global.ihs.com](http://www.global.ihs.com)).

*Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping*, American Welding Society Standard AWS F4.1, from Global Engineering Documents (phone: 1-877-413-5184, website: [www.global.ihs.com](http://www.global.ihs.com)).

*National Electrical Code*, NFPA Standard 70, from National Fire Protection Association, P.O. Box 9101, Quincy, MA 02269-9101 (phone: 617-770-3000, website: [www.nfpa.org](http://www.nfpa.org) and [www.sparky.org](http://www.sparky.org)).

*Safe Handling of Compressed Gases in Cylinders*, CGA Pamphlet P-1, from Compressed Gas Association, 4221 Walney Road, 5th Floor, Chantilly, VA 20151 (phone: 703-788-2700, website: [www.cganet.com](http://www.cganet.com)).

*Code for Safety in Welding and Cutting*, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 5060 Mississauga,

Ontario, Canada L4W 5N5 (phone: 800-463-6727 or in Toronto 416-747-4044, website: [www.csa-international.org](http://www.csa-international.org)).

*Safe Practice For Occupational And Educational Eye And Face Protection*, ANSI Standard Z87.1, from American National Standards Institute, 25 West 43rd Street, New York, NY 10036-8002 (phone: 212-642-4900, website: [www.ansi.org](http://www.ansi.org)).

*Standard for Fire Prevention During Welding, Cutting, and Other Hot Work*, NFPA Standard 51B, from National Fire Protection Association, P.O. Box 9101, Quincy, MA 02269-9101 (phone: 617-770-3000, website: [www.nfpa.org](http://www.nfpa.org)).

OSHA, Occupational Safety and Health Standards for General Industry, Title 29, Code of Federal Regulations (CFR), Part 1910, Subpart Q, and Part 1926, Subpart J, from U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954 (phone: 1-866-512-1800) (there are 10 Regional Offices—phone for Region 5, Chicago, is 312-353-2220, website: [www.osha.gov](http://www.osha.gov)).

## 1-6. EMF Information

Considerations About Welding And The Effects Of Low Frequency Electric And Magnetic Fields

Welding current, as it flows through welding cables, will cause electromagnetic fields. There has been and still is some concern about such fields. However, after examining more than 500 studies spanning 17 years of research, a special blue ribbon committee of the National Research Council concluded that: "The body of evidence, in the committee's judgment, has not demonstrated that exposure to power-frequency electric and magnetic fields is a human-health hazard." However, studies are still going forth and evidence continues to be examined. Until the final conclusions of the research are reached, you may wish to minimize your exposure to electromagnetic fields when welding or cutting.

To reduce magnetic fields in the workplace, use the following procedures:

1. Keep cables close together by twisting or taping them, or using a cable cover.
2. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around your body.
4. Keep welding power source and cables as far away from operator as practical.
5. Connect work clamp to workpiece as close to the weld as possible.

### About Implanted Medical Devices:

Implanted Medical Device wearers should consult their doctor and the device manufacturer before performing or going near arc welding, spot welding, gouging, plasma arc cutting, or induction heating operations. If cleared by your doctor, then following the above procedures is recommended.



# SECTION 2 – CONSIGNES DE SÉCURITÉ – LIRE AVANT UTILISATION

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Se protéger et protéger les autres contre le risque de blessure — lire et respecter ces consignes.

## 2-1. Symboles utilisés



**DANGER!** – Indique une situation dangereuse qui si on l'évite pas peut donner la mort ou des blessures graves. Les dangers possibles sont montrés par les symboles joints ou sont expliqués dans le texte.



Indique une situation dangereuse qui si on l'évite pas peut donner la mort ou des blessures graves. Les dangers possibles sont montrés par les symboles joints ou sont expliqués dans le texte.

**NOTE** – Indique des déclarations pas en relation avec des blessures personnelles.

 Indique des instructions spécifiques.



Ce groupe de symboles veut dire Avertissement! Attention! DANGER DE CHOC ELECTRIQUE, PIECES EN MOUVEMENT, et PIECES CHAUDES. Consulter les symboles et les instructions ci-dessous y afférant pour les actions nécessaires afin d'éviter le danger.

## 2-2. Dangers relatifs au soudage à l'arc



Les symboles représentés ci-dessous sont utilisés dans ce manuel pour attirer l'attention et identifier les dangers possibles. En présence de l'un de ces symboles, prendre garde et suivre les instructions afférentes pour éviter tout risque. Les instructions en matière de sécurité indiquées ci-dessous ne constituent qu'un sommaire des instructions de sécurité plus complètes fournies dans les normes de sécurité énumérées dans la Section 2-5. Lire et observer toutes les normes de sécurité.



Seul un personnel qualifié est autorisé à installer, faire fonctionner, entretenir et réparer cet appareil.



Pendant le fonctionnement, maintenir à distance toutes les personnes, notamment les enfants de l'appareil.



### UNE DÉCHARGE ÉLECTRIQUE peut entraîner la mort.

Le contact d'organes électriques sous tension peut provoquer des accidents mortels ou des brûlures graves. Le circuit de l'électrode et de la pièce est sous tension lorsque le courant est délivré à la sortie. Le circuit d'alimentation et les circuits internes de la machine sont également sous tension lorsque l'alimentation est sur Marche. Dans le mode de soudage avec du fil, le fil, le dérouleur, le bloc de commande du rouleau et toutes les parties métalliques en contact avec le fil sont sous tension électrique. Un équipement installé ou mis à la terre de manière incorrecte ou impropre constitue un danger.

- Ne pas toucher aux pièces électriques sous tension.
- Porter des gants isolants et des vêtements de protection secs et sans trous.
- S'isoler de la pièce à couper et du sol en utilisant des housses ou des tapis assez grands afin d'éviter tout contact physique avec la pièce à couper ou le sol.
- Ne pas se servir de source électrique à courant électrique dans les zones humides, dans les endroits confinés ou là où on risque de tomber.
- Se servir d'une source électrique à courant électrique UNIQUEMENT si le procédé de soudage le demande.
- Si l'utilisation d'une source électrique à courant électrique s'avère nécessaire, se servir de la fonction de télécommande si l'appareil en est équipé.
- D'autres consignes de sécurité sont nécessaires dans les conditions suivantes : risques électriques dans un environnement humide ou si l'on porte des vêtements mouillés ; sur des structures métalliques telles que sols, grilles ou échafaudages ; en position coincée comme assise, à genoux ou couchée ; ou s'il y a un risque élevé de contact inévitable ou accidentel avec la pièce à souder ou le sol. Dans ces conditions, utiliser les équipements suivants, dans l'ordre indiqué : 1) un poste à souder DC à tension constante

(à fil), 2) un poste à souder DC manuel (électrode) ou 3) un poste à souder AC à tension à vide réduite. Dans la plupart des situations, l'utilisation d'un poste à souder DC à fil à tension constante est recommandée. En outre, ne pas travailler seul !

- Couper l'alimentation ou arrêter le moteur avant de procéder à l'installation, à la réparation ou à l'entretien de l'appareil. Déverrouiller l'alimentation selon la norme OSHA 29 CFR 1910.147 (voir normes de sécurité).
- Installer le poste correctement et le mettre à la terre convenablement selon les consignes du manuel de l'opérateur et les normes nationales, provinciales et locales.
- Toujours vérifier la terre du cordon d'alimentation. Vérifier et s'assurer que le fil de terre du cordon d'alimentation est bien raccordé à la borne de terre du sectionneur ou que la fiche du cordon est raccordée à une prise correctement mise à la terre.
- En effectuant les raccordements d'entrée, fixer d'abord le conducteur de mise à la terre approprié et contre-vérifier les connexions.
- Les câbles doivent être exempts d'humidité, d'huile et de graisse ; protégez-les contre les étincelles et les pièces métalliques chaudes.
- Vérifier fréquemment le cordon d'alimentation afin de s'assurer qu'il n'est pas altéré ou à nu, le remplacer immédiatement s'il l'est. Un fil à nu peut entraîner la mort.
- L'équipement doit être hors tension lorsqu'il n'est pas utilisé.
- Ne pas utiliser des câbles usés, endommagés, de grosseur insuffisante ou mal épissés.
- Ne pas enrouler les câbles autour du corps.
- Si la pièce soudée doit être mise à la terre, le faire directement avec un câble distinct.
- Ne pas toucher l'électrode quand on est en contact avec la pièce, la terre ou une électrode provenant d'une autre machine.
- Ne pas toucher des porte électrodes connectés à deux machines en même temps à cause de la présence d'une tension à vide doublée.
- N'utiliser qu'un matériel en bon état. Réparer ou remplacer sur-le-champ les pièces endommagées. Entretenir l'appareil conformément à ce manuel.
- Porter un harnais de sécurité si l'on doit travailler au-dessus du sol.
- S'assurer que tous les panneaux et couvercles sont correctement en place.
- Fixer le câble de retour de façon à obtenir un bon contact métal-métal avec la pièce à souder ou la table de travail, le plus près possible de la soudure.
- Isoler la pince de masse quand pas mis à la pièce pour éviter le contact avec tout objet métallique.
- Ne pas raccorder plus d'une électrode ou plus d'un câble de masse à une même borne de sortie de soudage.

**Il reste une TENSION DC NON NÉGLIGEABLE dans les sources de soudage onduleur quand on a coupé l'alimentation.**

- Arrêter les convertisseurs, débrancher le courant électrique et décharger les condensateurs d'alimentation selon les instructions indiquées dans la partie Entretien avant de toucher les pièces.



### **DES PIÈCES CHAUDES peuvent provoquer des brûlures graves.**

- Ne pas toucher à mains nues les parties chaudes.
- Prévoir une période de refroidissement avant de travailler à l'équipement.
- Ne pas toucher aux pièces chaudes, utiliser les outils recommandés et porter des gants de soudage et des vêtements épais pour éviter les brûlures.



### **LES FUMÉES ET LES GAZ peuvent être dangereux.**

Le soudage génère des fumées et des gaz. Leur inhalation peut être dangereuse pour votre santé.

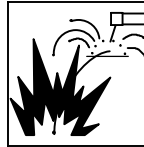
- Eloigner votre tête des fumées. Ne pas respirer les fumées.
- À l'intérieur, ventiler la zone et/ou utiliser une ventilation forcée au niveau de l'arc pour l'évacuation des fumées et des gaz de soudage.
- Si la ventilation est médiocre, porter un respirateur anti-vapeurs approuvé.
- Lire et comprendre les spécifications de sécurité des matériaux (MSDS) et les instructions du fabricant concernant les métaux, les consommables, les revêtements, les nettoyants et les dégraissants.
- Travailler dans un espace fermé seulement s'il est bien ventilé ou en portant un respirateur à alimentation d'air. Demander toujours à un surveillant dûment formé de se tenir à proximité. Des fumées et des gaz de soudage peuvent déplacer l'air et abaisser le niveau d'oxygène provoquant des blessures ou des accidents mortels. S'assurer que l'air de respiration ne présente aucun danger.
- Ne pas souder dans des endroits situés à proximité d'opérations de dégraissage, de nettoyage ou de pulvérisation. La chaleur et les rayons de l'arc peuvent réagir en présence de vapeurs et former des gaz hautement toxiques et irritants.
- Ne pas souder des métaux munis d'un revêtement, tels que l'acier galvanisé, plaqué en plomb ou au cadmium à moins que le revêtement n'ait été enlevé dans la zone de soudure, que l'endroit soit bien ventilé, et en portant un respirateur à alimentation d'air. Les revêtements et tous les métaux renfermant ces éléments peuvent dégager des fumées toxiques en cas de soudage.



### **LES RAYONS DE L'ARC peuvent provoquer des brûlures dans les yeux et sur la peau.**

Le rayonnement de l'arc du procédé de soudage génère des rayons visibles et invisibles intenses (ultraviolets et infrarouges) susceptibles de provoquer des brûlures dans les yeux et sur la peau. Des étincelles sont projetées pendant le soudage.

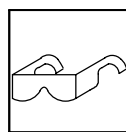
- Porter un casque de soudage approuvé muni de verres filtrants appropriés pour protéger visage et yeux pendant le soudage (voir ANSI Z49.1 et Z87.1 énuméré dans les normes de sécurité).
- Porter des lunettes de sécurité avec écrans latéraux même sous votre casque.
- Avoir recours à des écrans protecteurs ou à des rideaux pour protéger les autres contre les rayonnements les éblouissements et les étincelles ; prévenir toute personne sur les lieux de ne pas regarder l'arc.
- Porter des vêtements confectionnés avec des matières résistantes et ignifuges (cuir, coton lourd ou laine) et des bottes de protection.



### **LE SOUDAGE peut provoquer un incendie ou une explosion.**

Le soudage effectué sur des conteneurs fermés tel que des réservoirs, tambours ou des conduites peut provoquer leur éclatement. Des étincelles peuvent être projetées de l'arc de soudure. La projection d'étincelles, des pièces chaudes et des équipements chauds peut provoquer des incendies et des brûlures. Le contact accidentel de l'électrode avec des objets métalliques peut provoquer des étincelles, une explosion, un surchauffement ou un incendie. Avant de commencer le soudage, vérifier et s'assurer que l'endroit ne présente pas de danger.

- Déplacer toutes les substances inflammables à une distance de 10,7 m de l'arc de soudage. En cas d'impossibilité les recouvrir soigneusement avec des protections homologuées.
- Ne pas souder dans un endroit où des étincelles peuvent tomber sur des substances inflammables.
- Se protéger et d'autres personnes de la projection d'étincelles et de métal chaud.
- Des étincelles et des matériaux chauds du soudage peuvent facilement passer dans d'autres zones en traversant de petites fissures et des ouvertures.
- Surveiller tout déclenchement d'incendie et tenir un extincteur à proximité.
- Le soudage effectué sur un plafond, plancher, paroi ou séparation peut déclencher un incendie de l'autre côté.
- Ne pas effectuer le soudage sur des conteneurs fermés tels que des réservoirs, tambours, ou conduites, à moins qu'ils n'aient été préparés correctement conformément à AWS F4.1 (voir les normes de sécurité).
- Ne soudez pas si l'air ambiant est chargé de particules, gaz, ou vapeurs inflammables (vapeur d'essence, par exemple).
- Brancher le câble de masse sur la pièce la plus près possible de la zone de soudage pour éviter le transport du courant sur une longue distance par des chemins inconnus éventuels en provoquant des risques d'électrocution, d'étincelles et d'incendie.
- Ne pas utiliser le poste de soudage pour dégeler des conduites gelées.
- En cas de non utilisation, enlever la baguette d'électrode du porte-électrode ou couper le fil à la pointe de contact.
- Porter des vêtements de protection dépourvus d'huile tels que des gants en cuir, une chemise en matériau lourd, des pantalons sans revers, des chaussures hautes et un couvre chef.
- Avant de souder, retirer toute substance combustible de vos poches telles qu'un allumeur au butane ou des allumettes.
- Une fois le travail achevé, assurez-vous qu'il ne reste aucune trace d'étincelles incandescentes ni de flammes.
- Utiliser exclusivement des fusibles ou coupe-circuits appropriés. Ne pas augmenter leur puissance; ne pas les ponter.
- Une fois le travail achevé, assurez-vous qu'il ne reste aucune trace d'étincelles incandescentes ni de flammes.
- Utiliser exclusivement des fusibles ou coupe-circuits appropriés. Ne pas augmenter leur puissance; ne pas les ponter.
- Suivre les recommandations dans OSHA 1910.252(a)(2)(iv) et NFPA 51B pour les travaux à chaud et avoir de la surveillance et un extincteur à proximité.



### **DES PIÈCES DE METAL ou DES SALETES peuvent provoquer des blessures dans les yeux.**

- Le soudage, l'écaillage, le passage de la pièce à la brosse en fil de fer, et le meulage génèrent des étincelles et des particules métalliques volantes. Pendant la période de refroidissement des soudures, elles risquent de projeter du laitier.
- Porter des lunettes de sécurité avec écrans latéraux ou un écran facial.



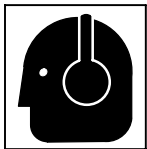
### LES ACCUMULATIONS DE GAZ risquent de provoquer des blessures ou même la mort.

- Fermer l'alimentation du gaz protecteur en cas de non-utilisation.
- Veiller toujours à bien aérer les espaces confinés ou se servir d'un respirateur d'adduction d'air homologué.



### LES CHAMPS MAGNETIQUES peuvent affecter des implants médicaux.

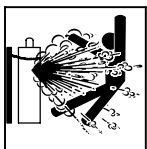
- Porteur de simulateur cardiaque ou autre implants médicaux, rester à distance.
- Les porteurs d'implants doivent d'abord consulter leur médecin avant de s'approcher des opérations de soudage à l'arc, de soudage par points, de gougeage, du coupage plasma ou de chauffage par induction.



### LE BRUIT peut endommager l'ouïe.

Le bruit des processus et des équipements peut affecter l'ouïe.

- Porter des protections approuvées pour les oreilles si le niveau sonore est trop élevé.



### LES BOUTEILLES peuvent exploser si elles sont endommagées.

Des bouteilles de gaz protecteur contiennent du gaz sous haute pression. Si une bouteille est endommagée, elle peut exploser. Du fait que les bouteilles de gaz font normalement partie du procédé de soudage, les manipuler avec précaution.

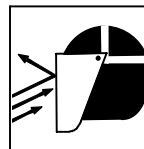
- Protéger les bouteilles de gaz comprimé d'une chaleur excessive, des chocs mécaniques, des dommages physiques, du laitier, des flammes ouvertes, des étincelles et des arcs.
- Placer les bouteilles debout en les fixant dans un support stationnaire ou dans un porte-bouteilles pour les empêcher de tomber ou de se renverser.
- Tenir les bouteilles éloignées des circuits de soudage ou autres circuits électriques.
- Ne jamais placer une torche de soudage sur une bouteille à gaz.
- Une électrode de soudage ne doit jamais entrer en contact avec une bouteille.
- Ne jamais souder une bouteille pressurisée – risque d'explosion.
- Utiliser seulement des bouteilles de gaz protecteur, régulateurs, tuyaux et raccords convenables pour cette application spécifique ; les maintenir ainsi que les éléments associés en bon état.
- Détourner votre visage du détendeur-régulateur lorsque vous ouvrez la soupape de la bouteille.
- Le couvercle du détendeur doit toujours être en place, sauf lorsque la bouteille est utilisée ou qu'elle est reliée pour usage ultérieur.
- Utiliser les équipements corrects, les bonnes procédures et suffisamment de personnes pour soulever et déplacer les bouteilles.
- Lire et suivre les instructions sur les bouteilles de gaz comprimé, l'équipement connexe et le dépliant P-1 de la CGA (Compressed Gas Association) mentionné dans les principales normes de sécurité.

## 2-3. Dangers supplémentaires en relation avec l'installation, le fonctionnement et la maintenance



### Risque D'INCENDIE OU D'EXPLOSION.

- Ne pas placer l'appareil sur, au-dessus ou à proximité de surfaces inflammables.
- Ne pas installer l'appareil à proximité de produits inflammables.
- Ne pas surcharger l'installation électrique – s'assurer que l'alimentation est correctement dimensionnée et protégée avant de mettre l'appareil en service.



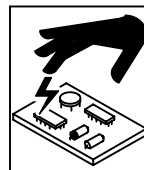
### LES ÉTINCELLES VOLANTES risquent de provoquer des blessures.

- Porter un écran facial pour protéger le visage et les yeux.
- Affûter l'électrode au tungstène uniquement à la meuleuse dotée de protecteurs. Cette manœuvre est à exécuter dans un endroit sûr lorsque l'on porte l'équipement homologué de protection du visage, des mains et du corps.
- Les étincelles risquent de causer un incendie – éloigner toute substance inflammable.



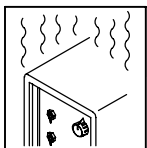
### LA CHUTE DE L'APPAREIL peut blesser.

- Utiliser l'anneau de levage uniquement pour soulever l'appareil, NON PAS les chariots, les bouteilles de gaz ou tout autre accessoire.
- Utiliser un équipement de levage de capacité suffisante pour lever l'appareil.
- En utilisant des fourches de levage pour déplacer l'unité, s'assurer que les fourches sont suffisamment longues pour dépasser du côté opposé de l'appareil.



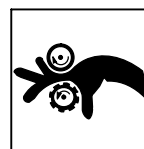
### LES CHARGES ÉLECTROSTATIQUES peuvent endommager les circuits imprimés.

- Établir la connexion avec la barrette de terre avant de manipuler des cartes ou des pièces.
- Utiliser des pochettes et des boîtes antistatiques pour stocker, déplacer ou expédier des cartes de circuits imprimés.



### L'EMPLOI EXCESSIF peut SURCHAUFFER L'ÉQUIPEMENT.

- Prévoir une période de refroidissement ; respecter le cycle opératoire nominal.
- Réduire le courant ou le facteur de marche avant de poursuivre le soudage.
- Ne pas obstruer les passages d'air du poste.



### DES ORGANES MOBILES peuvent provoquer des blessures.

- Ne pas s'approcher des organes mobiles.
- Ne pas s'approcher des points de coincement tels que des rouleaux de commande.



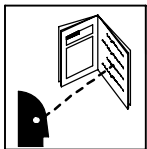
### LES FILS DE SOUDAGE peuvent provoquer des blessures.

- Ne pas appuyer sur la gâchette avant d'en avoir reçu l'instruction.
- Ne pas diriger le pistolet vers soi, d'autres personnes ou toute pièce mécanique en engageant le fil de soudage.



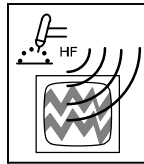
### DES ORGANES MOBILES peuvent provoquer des blessures.

- S'abstenir de toucher des organes mobiles tels que des ventilateurs.
- Maintenir fermés et verrouillés les portes, panneaux, recouvrements et dispositifs de protection.
- Seules des personnes qualifiées sont autorisées à enlever les portes, panneaux, recouvrements ou dispositifs de protection pour l'entretien.
- Remettre les portes, panneaux, recouvrements ou dispositifs de protection quand l'entretien est terminé et avant de rebrancher l'alimentation électrique.



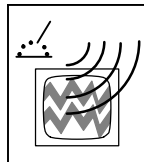
### LIRE LES INSTRUCTIONS.

- Lisez le manuel d'instructions avant l'utilisation ou la maintenance de l'appareil.
- N'utiliser que les pièces de rechange recommandées par le constructeur.
- Effectuer régulièrement le contrôle et l'entretien de l'installation.
- Maintenir soigneusement fermés les portes et les panneaux des sources de haute fréquence, maintenir les éclateurs à une distance correcte et utiliser une terre et un blindage pour réduire les interférences éventuelles.



### LE RAYONNEMENT HAUTE FRÉQUENCE (H.F.) risque de provoquer des interférences.

- Le rayonnement haute fréquence (H.F.) peut provoquer des interférences avec les équipements de radio-navigation et de communication, les services de sécurité et les ordinateurs.
- Demander seulement à des personnes qualifiées familiarisées avec des équipements électroniques de faire fonctionner l'installation.
- L'utilisateur est tenu de faire corriger rapidement par un électricien qualifié les interférences résultant de l'installation.
- Si le FCC signale des interférences, arrêter immédiatement l'appareil.



### LE SOUDAGE À L'ARC risque de provoquer des interférences.

- L'énergie électromagnétique risque de provoquer des interférences pour l'équipement électronique sensible tel que les ordinateurs et l'équipement commandé par ordinateur tel que les robots.
- Veiller à ce que tout l'équipement de la zone de soudage soit compatible électromagnétiquement.
- Pour réduire la possibilité d'interférence, maintenir les câbles de soudage aussi courts que possible, les grouper, et les poser aussi bas que possible (ex. par terre).
- Veiller à souder à une distance de 100 mètres de tout équipement électronique sensible.
- Veiller à ce que ce poste de soudage soit posé et mis à la terre conformément à ce mode d'emploi.
- En cas d'interférences après avoir pris les mesures précédentes, il incombe à l'utilisateur de prendre des mesures supplémentaires telles que le déplacement du poste, l'utilisation de câbles blindés, l'utilisation de filtres de ligne ou la pose de protecteurs dans la zone de travail.

## 2-4. Proposition californienne 65 Avertissements



Les équipements de soudage et de coupage produisent des fumées et des gaz qui contiennent des produits chimiques dont l'État de Californie reconnaît qu'ils provoquent des malformations congénitales et, dans certains cas, des cancers. (Code de santé et de sécurité de Californie, chapitre 25249.5 et suivants)



Les batteries, les bornes et autres accessoires contiennent du plomb et des composés à base de plomb, produits chimiques dont l'État de Californie reconnaît qu'ils provoquent des cancers et des malformations congénitales ou autres problèmes de procréation. Se laver les mains après manipulation.

Pour les moteurs à essence :



Les gaz d'échappement des moteurs contiennent des produits chimiques dont l'État de Californie reconnaît qu'ils provoquent des cancers et des malformations congénitales ou autres problèmes de procréation.

Pour les moteurs diesel :



Les gaz d'échappement des moteurs diesel et certains de leurs composants sont reconnus par l'État de Californie comme provoquant des cancers et des malformations congénitales ou autres problèmes de procréation.

## 2-5. Principales normes de sécurité

*Safety in Welding, Cutting, and Allied Processes*, ANSI Standard Z49.1, de Global Engineering Documents (téléphone : 1-877-413-5184, site Internet : [www.global.ihc.com](http://www.global.ihc.com)).

*Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping*, American Welding Society Standard AWS F4.1 de Global Engineering Documents (téléphone : 1-877-413-5184, site Internet : [www.global.ihc.com](http://www.global.ihc.com)).

*National Electrical Code*, NFPA Standard 70, de National Fire Protection Association, P.O. Box 9101, Quincy, MA 02269-9101 (téléphone : 617-770-3000, site Internet : [www.nfpa.org](http://www.nfpa.org)).

*Safe Handling of Compressed Gases in Cylinders*, CGA Pamphlet P-1, de Compressed Gas Association, 4221 Walney Road, 5th Floor, Chantilly, VA 20151 (téléphone : 703-788-2700, site Internet : [www.cganet.com](http://www.cganet.com)).

*Code for Safety in Welding and Cutting*, CSA Standard W117.2, de Canadian Standards Association, 5060 Mississauga, Ontario, Canada

L4W 5NS (téléphone : 800-463-6727 ou à Toronto 416-747-4044, site Internet : [www.csa-international.org](http://www.csa-international.org)).

*Safe Practice For Occupational And Educational Eye And Face Protection*, ANSI Standard Z87.1, de American National Standards Institute, 11 West 43rd Street, New York, NY 10036-8002 (téléphone : 212-642-4900, site Internet : [www.ansi.org](http://www.ansi.org)).

*Standard for Fire Prevention During Welding, Cutting, and Other Hot Work*, NFPA Standard 51B, de National Fire Protection Association, P.O. Box 9101, Quincy, MA 02269-9101 (téléphone : 617-770-3000, site Internet : [www.nfpa.org](http://www.nfpa.org)).

OSHA, Occupational Safety and Health Standards for General Industry, Title 29, Code of Federal Regulations (CFR), Part 1910, Subpart Q, and Part 1926, Subpart J, de U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954 (téléphone : 1-866-512-1800) (il y a 10 bureaux régionaux—le téléphone de la région 5, Chicago, est 312-353-2220, site Internet : [www.osha.gov](http://www.osha.gov)).

## 2-6. Information EMF

Considérations sur le soudage et les effets de basse fréquence et des champs magnétiques et électriques.

Le courant de soudage, pendant son passage dans les câbles de soudage, causera des champs électromagnétiques. Il y a eu et il y a encore un certain souci à propos de tels champs. Cependant, après avoir examiné plus de 500 études qui ont été faites pendant une période de recherche de 17 ans, un comité spécial ruban bleu du National Research Council a conclu : « L'accumulation de preuves, suivant le jugement du comité, n'a pas démontré que l'exposition aux champs magnétiques et champs électriques à haute fréquence représente un risque à la santé humaine ». Toutefois, des études sont toujours en cours et les preuves continuent à être examinées. En attendant que les conclusions finales de la recherche soient établies, il vous serait souhaitable de réduire votre exposition aux champs électromagnétiques pendant le soudage ou le coupage.

Pour réduire les champs magnétiques sur le poste de travail, appliquer les procédures suivantes :

1. Garder les câbles ensemble, les torsader, les scotcher, ou les recouvrir d'une housse.
2. Disposer les câbles d'un côté et à distance de l'opérateur.
3. Ne pas courber pas et ne pas entourer pas les câbles autour de votre corps.
4. Garder le poste de soudage et les câbles le plus loin possible de vous.
5. Connecter la pince sur la pièce aussi près que possible de la soudure.

### En ce qui concerne les implants médicaux :

Les porteurs d'implants doivent d'abord consulter leur médecin avant de s'approcher des opérations de soudage à l'arc, de soudage par points, de gougeage, du coupage plasma ou de chauffage par induction. Si le médecin approuve, il est recommandé de suivre les procédures précédentes.





## SECTION 3 – INSTALLATION

### 3-1. Specifications

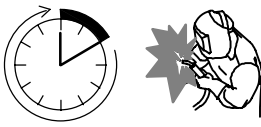
AC or DC Rated Output	Voltage Range in CV Mode	Amperage Range in CC Mode	Max. Open- Circuit Voltage	RMS Amps Input at Rated Load Output, 3-Phase at NEMA Load Voltages and Class I Rating				KVA	KW
				380/400/415 V (50/60 Hz)	460 V (60 Hz)	500 V (50/60 Hz)	575 V (60 Hz)		
1000 A at 44 V, 100% Duty Cycle; 1250 A at 44 V, 60% Duty Cycle	25–44 V	250–1250 A	71 V	143 (3*)	124 (3*)	114 (3*)	100 (3*)	98 (2.37*)	53 (0.95*)

\*While idling

### 3-2. Duty Cycle and Overheating

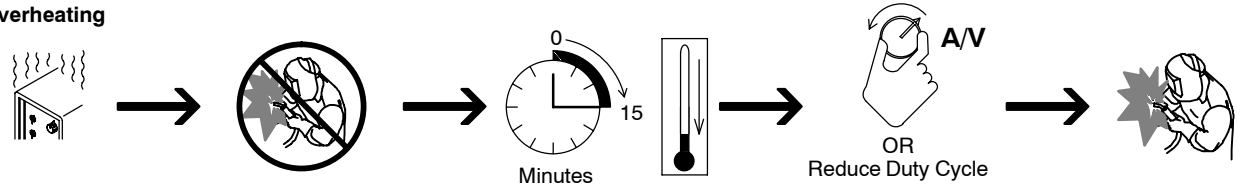
**100% Duty Cycle At 1000 Amperes**



Continuous Welding

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**Overheating**



Duty Cycle is percentage of 10 minutes that unit can weld at rated load without overheating.

If unit overheats, high temperature shutdown light turns On, thermostat(s) opens, output stops, and cooling fan runs. Wait fifteen minutes for unit to cool. Reduce amperage or duty cycle before welding.

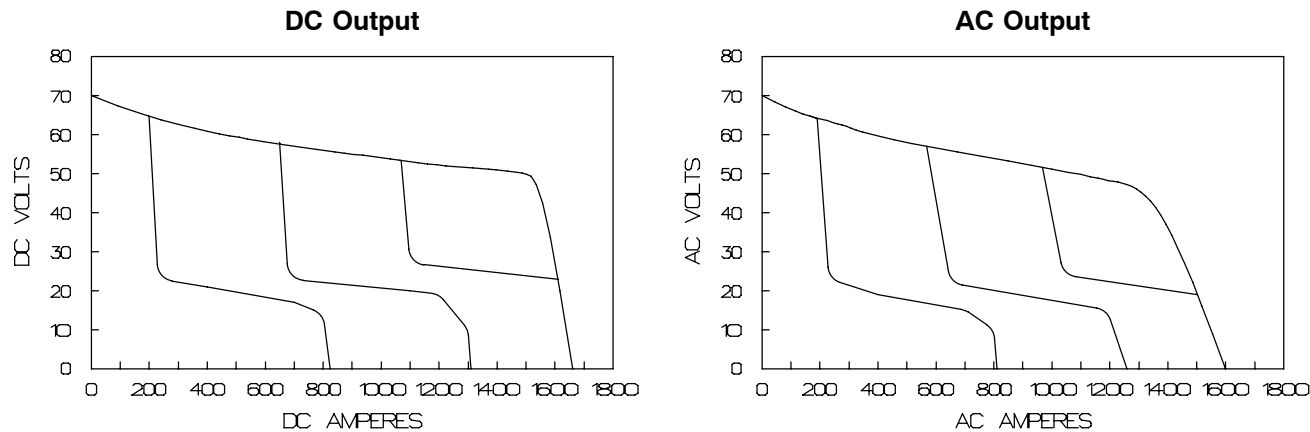
**NOTICE** – Exceeding duty cycle can damage unit and void warranty.

duty1 4/95 – 181 560

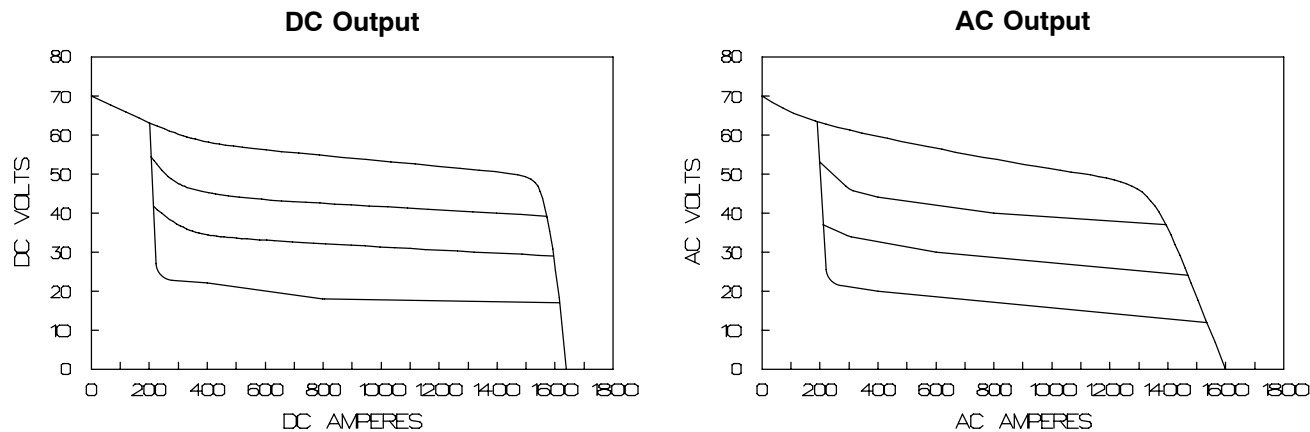
3-3. Volt-Ampere Curves

Volt-ampere curves show minimum and maximum voltage and amperage output capabilities of unit. Curves of other settings fall between curves shown.

A. CC Mode

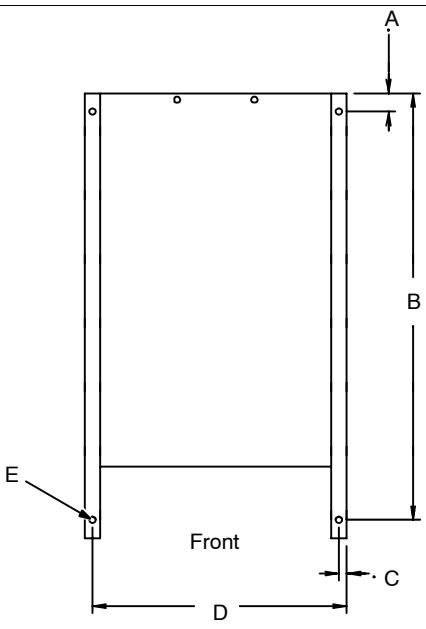


B. CV Mode








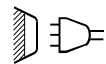


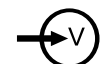






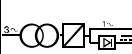






### 3-4. Dimensions And Weight

Dimensions		<p><b>Weight</b> 1225 lb (540 kg)</p> 
Height*	44 in (1118 mm)	
Width*	27-1/4 in (692 mm)	
Depth*	46 in (1168 mm)	
A	1-7/8 in (48 mm)	
B	44-1/8 in (1120 mm)	
C	11/16 in (17 mm)	
D	26-1/16 in (662 mm)	
E	4 holes: 21/32 in (6.5 mm) dia	

\* Includes lifting eye, handles, hardware, etc.

### 3-5. Symbol Definitions

 Some symbols are found only on CE products.

<b>A</b>	Amperage	<b>V</b>	Voltage	<b>Hz</b>	Hertz		Direct Current (DC)
	Alternating Current (AC)		Panel/Local		Line Connection	<b>3</b> 	Three Phase
	Output	<b>I</b>	On		Voltage Input		Off
	Submerged Arc Welding (SAW)		Read Operator's Manual		Remote	<b>X</b>	Duty Cycle
<b>%</b>	Percent	<b>U<sub>0</sub></b>	Rated No-Load Voltage (Average)	<b>U<sub>1</sub></b>	Rated Supply Voltage		Circuit Breaker (Supplementary Protector)
<b>U<sub>2</sub></b>	Conventional Load Voltage	<b>I<sub>2</sub></b>	Rated Welding Current		Protective Earth (Ground)	<b>I<sub>1max</sub></b>	Rated Maximum Supply Current
<b>I<sub>1eff</sub></b>	Maximum Effective Supply Current		3-Phase Power Source With AC/DC Output		Temperature		Ventilating And Air Circulating Fan
	Increase	<b>IP</b>	Degree Of Protection		Air Carbon Arc Cutting (CAC-A)		Shielding Metal Arc Welding (SMAW)
	Gas Metal Arc Welding (GMAW)						

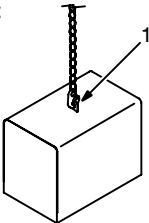
3-6. Manufacturer’s Rating Label For CE Products

		ISO/IEC 974-1		
		250 A / 25V		1250 A / 44V
		X	60%	100%
		I <sub>2</sub>	1250A	1000A
	U <sub>0</sub> = 71V	250 A / 25V		1250 A / 44V
		X	60%	100%
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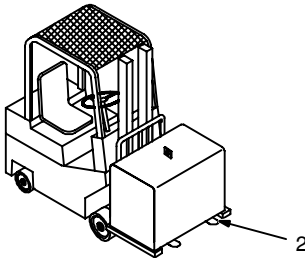
3-7. Selecting a Location



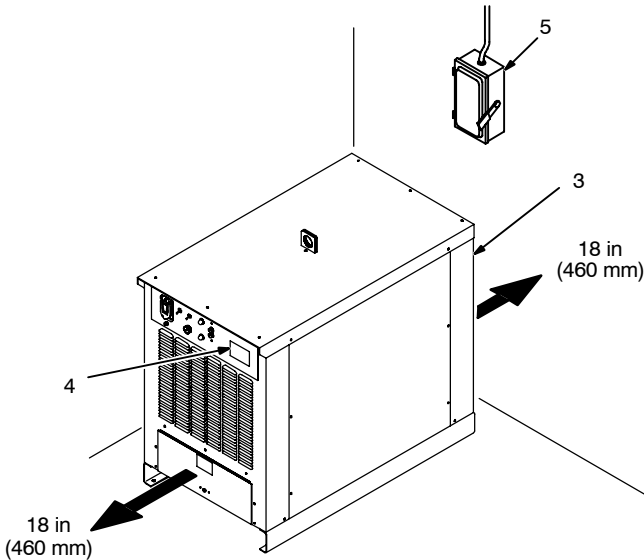
Movement



OR



Location



- 1 Lifting Eye
- 2 Lifting Forks

Use lifting eye or lifting forks to move unit.

If using lifting forks, extend forks beyond opposite side of unit.

- 3 Rating Label
- 4 Plate Label


Use rating or plate label to determine input power needs.



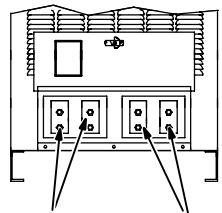
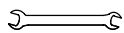
- 5 Line Disconnect Device

Locate unit near correct input power supply.

**⚠ Special installation may be required where gasoline or volatile liquids are present – see NEC Article 511 or CEC Section 20.**

### 3-8. Weld Output Terminals and Selecting Cable Sizes

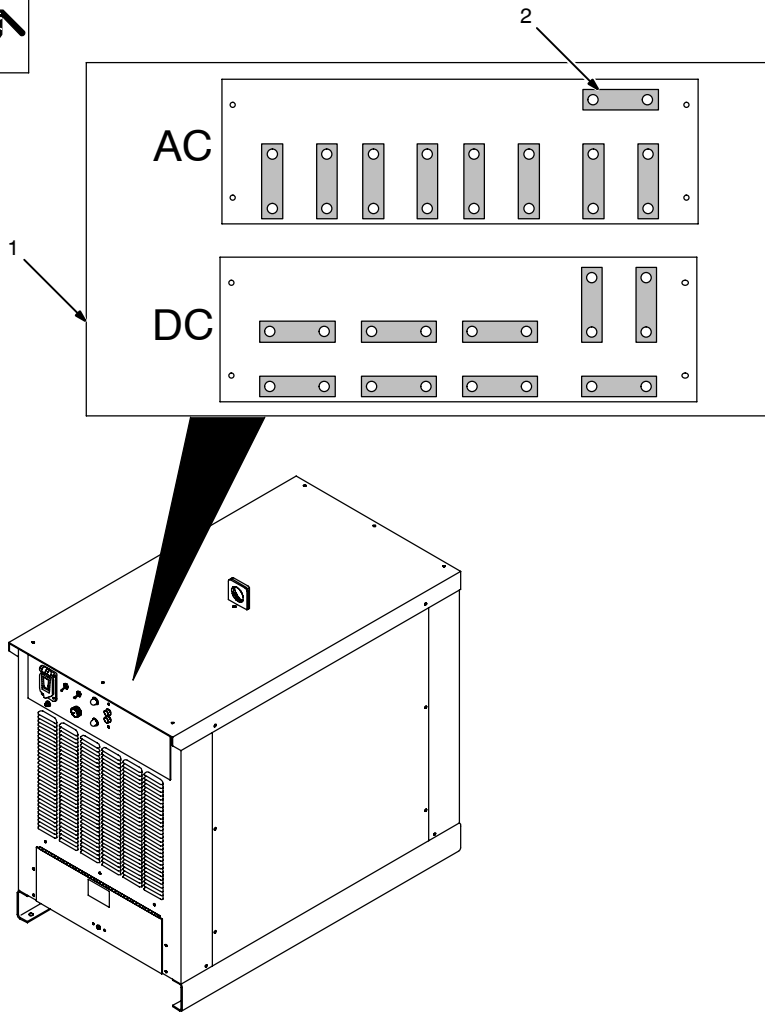
 In the table below, when multiple numbers are indicated separated by a hyphen, the number to the left of the hyphen indicates how many cables are to be used, and the number to the right indicates the size of the cable to be used. For example, 3-3/0 indicates that 3 cables of 3/0 gauge need to be used for electrode and work connections.

 <p><b>Weld Output Terminals</b></p> <p> Turn Off welding power source and disconnect input power before connecting to weld output terminals.</p>  <p>Electrode Weld Output Terminals      Work Weld Output Terminals</p> <p>Requires cable lugs with 5/8 in diameter holes.</p>  15/16 in	Total Cable (Copper) Length In Weld Circuit Not Exceeding								
	100 ft (30 m) Or Less		150 ft (45 m)	200 ft (60 m)	250 ft (70 m)	300 ft (90 m)	350 ft (105 m)	400 ft (120 m)	
	Welding Amperes	10 – 60% Duty Cycle	60 – 100% Duty Cycle	10 – 100% Duty Cycle					
	100	4	4	4	3	2	1	1/0	1/0
	150	3	3	2	1	1/0	2/0	3/0	3/0
	200	3	2	1	1/0	2/0	3/0	4/0	4/0
	250	2	1	1/0	2/0	3/0	4/0	2-2/0	2-2/0
	300	1	1/0	2/0	3/0	4/0	2-2/0	2-3/0	2-3/0
	350	1/0	2/0	3/0	4/0	2-2/0	2-3/0	2-3/0	2-4/0
	400	1/0	2/0	3/0	4/0	2-2/0	2-3/0	2-4/0	2-4/0
	500	2/0	3/0	4/0	2-2/0	2-3/0	2-4/0	3-3/0	3-3/0
	600	3/0	4/0	2-2/0	2-3/0	2-4/0	3-3/0	3-4/0	3-4/0
	700	4/0	2-2/0	2-3/0	2-4/0	3-3/0	3-4/0	3-4/0	4-4/0
	800	4/0	2-2/0	2-3/0	2-4/0	3-4/0	3-4/0	4-4/0	4-4/0
	900	2-2/0	2-3/0	2-4/0	3-3/0	3-4/0	4-4/0	4-4/0	
	1000	2-2/0	2-3/0	2-4/0	3-3/0	4-3/0	4-4/0		
	1250	2-3/0	2-4/0	3-3/0	4-3/0	4-4/0			

\*Weld cable size (AWG) is based on either a 4 volts or less drop or a current density of at least 300 circular mils per ampere. Contact your distributor for the mm<sup>2</sup> equivalent weld cable sizes.

S-0007-E

### 3-9. Selecting AC or DC Output



**⚠ Turn Off welding power source and disconnect input power before relinking unit.**

Remove top of unit.

1 AC/DC Output Selection Label (Located Inside Unit)

2 Jumper Links

Locate terminal board inside unit. Install jumper links for desired output as shown on label.

*⚠ Securing nuts must be removed to change the position of the three jumper links at the right of the terminal board. To change the position of the remaining six jumper links, loosen the securing nuts only to allow the slotted jumper links to be moved. Always securely re-tighten nuts after links are moved.*

Reinstall top of unit.

**⚠ See Safety Rules at beginning of manual for special AC concerns.**

Tools Needed:

3/8, 11/16, 7/8 in

801 881-A / Ref. S-185 482

### 3-10. Terminal Strip TE3 and Remote 14 Receptacle RC7 Information

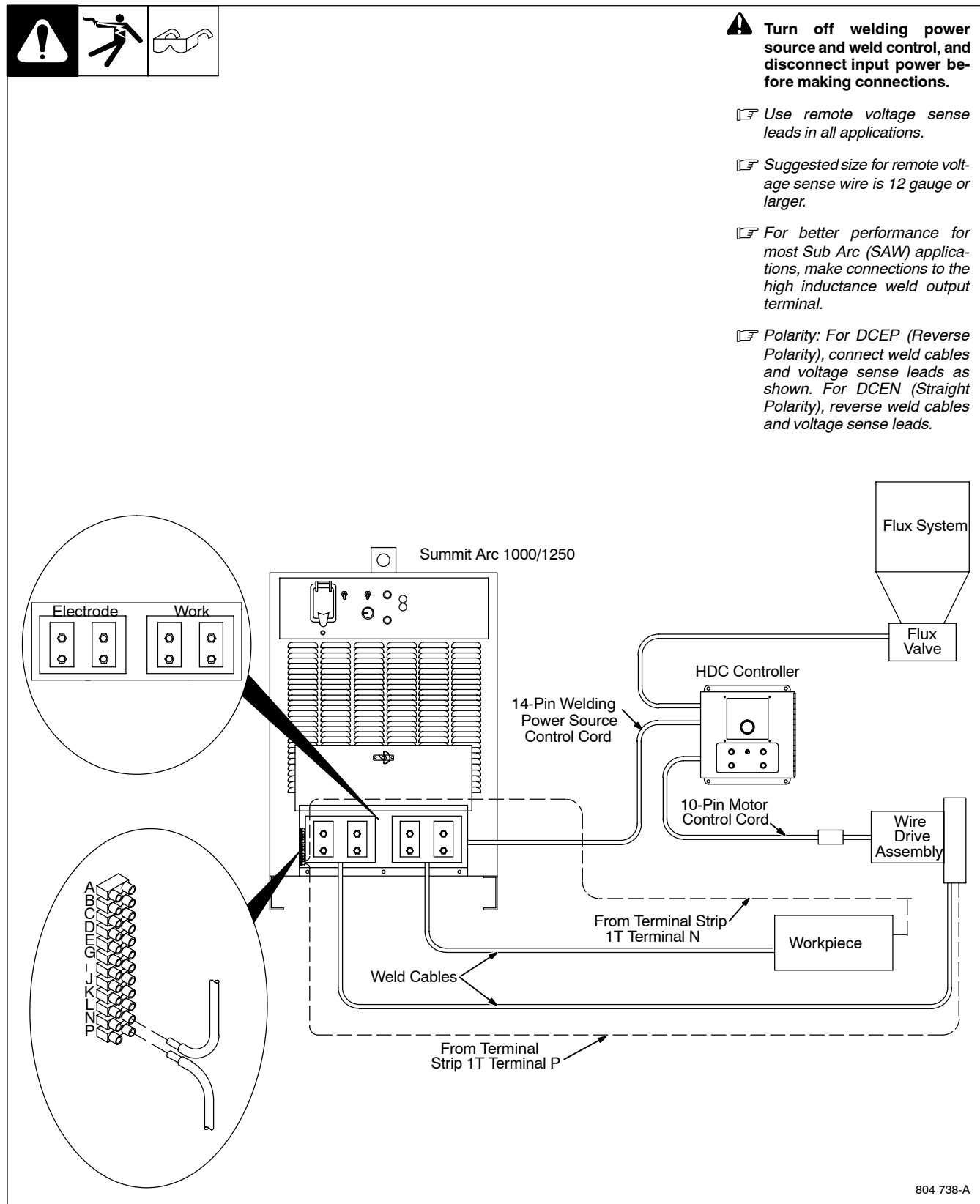
	Socket on RC7	Terminal on TE3	Information
<b>24 VOLTS AC</b> <b>OUTPUT (CONTACTOR)</b>	A	A	24 volts, 12 amperes, AC. Protected by circuit breaker CB2.
	B	B	Contact closure to A completes 24 volts AC contactor control circuit.
<b>REMOTE OUTPUT CONTROL</b>	C	C	Command reference; +10 volts DC.
	D	D	Remote control circuit common.
	E	E	0 to +10 volts DC input command signal from remote control.
<b>115 VOLTS AC</b> <b>OUTPUT (CONTACTOR)</b>	I	I	115 volts, 12 amperes AC. Protected by circuit breaker CB1.
	J	J	Contact closure to I completes 115 volts AC contactor control circuit.
<b>GND</b>	K	K	Chassis common.
	G	G	Circuit common for 24, 42 and 115 volts AC circuits.
<b>42 VOLTS AC</b>	*	L	42 volts, 12 amperes AC. Protected by circuit breaker CB3.
<b>A/V AMPERAGE VOLTAGE</b>	F	*	Current feedback; +1 volt DC per 100 amperes.
	H	*	Voltage feedback; +1 volt DC per 10 output terminal volts.
<b>REMOTE VOLTAGE SENSING</b>	*	N	Voltage sensing signal from Work weld output terminal.
	*	P	Voltage sensing signal from Electrode weld output terminal.

\* Not Used

### 3-11. Basic Sub Arc (SAW) Welding

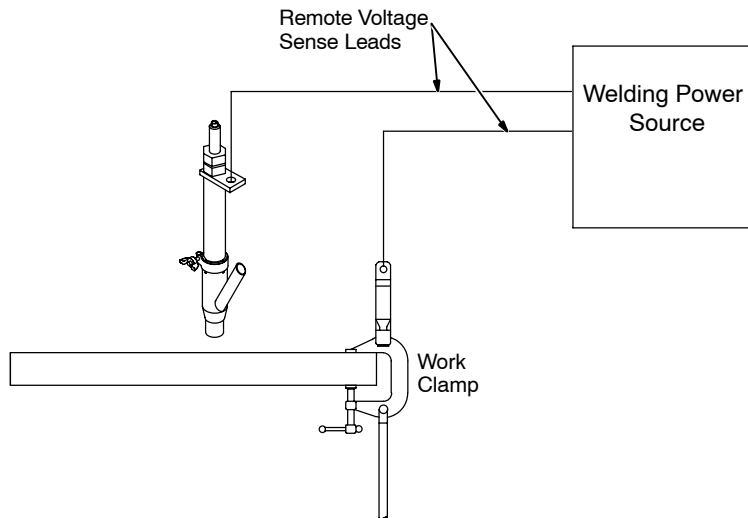
☞ Customer must supply the following: power source, power source control cable, wire drive assembly, wire drive assembly cable, drive rolls, gun, welding wire, weld cables, remote voltage sense leads, and flux system for the desired application.

#### A. Basic Sub Arc (SAW) Equipment Connections



804 738-A

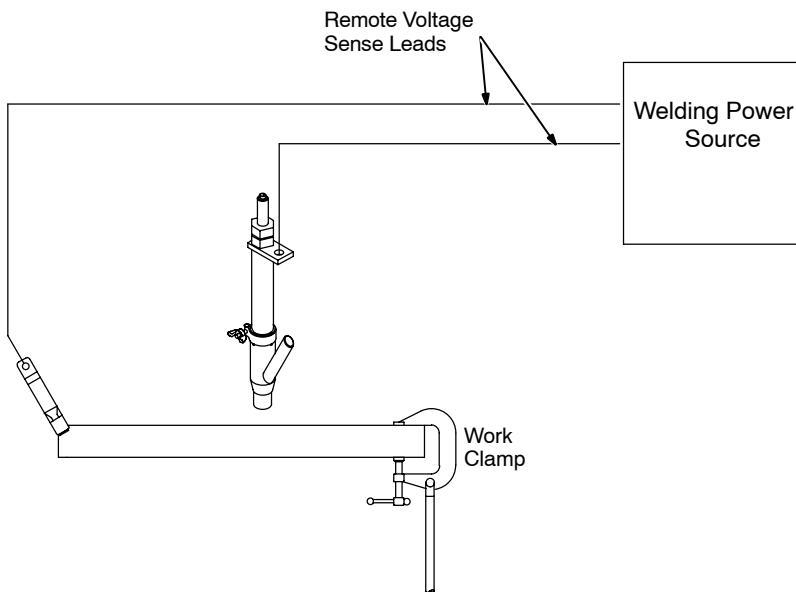
## B. Remote Voltage Sensing Leads Placement Guidelines For A Single Arc (Required)



### **BAD**

Sense lead is affected by weld current.

Due to voltage drops across work piece, arc voltage may be low, causing need for deviation from standard procedures.



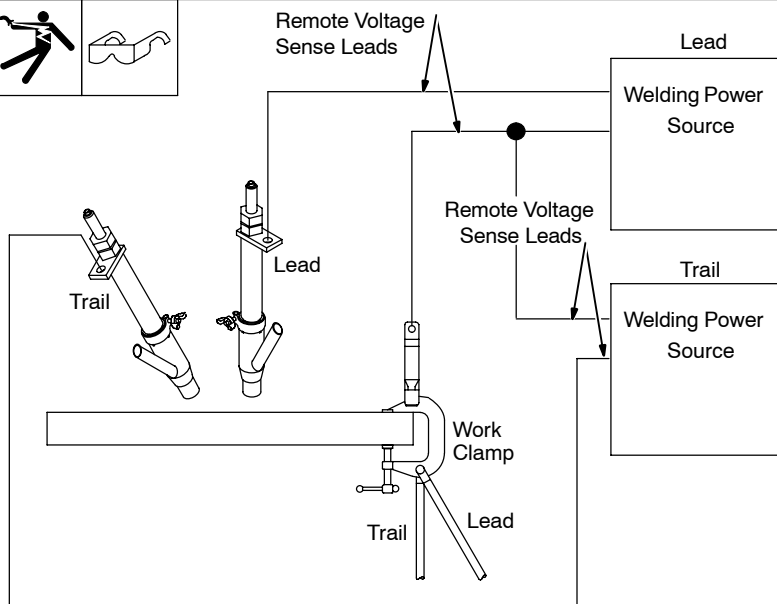
### **BEST**

Sense leads are out of the current paths.

Sense leads detect arc voltage accurately.

Best starts, arcs and most reliable results.

## C. Sensing Leads Placement Guidelines For Multiple Arcs

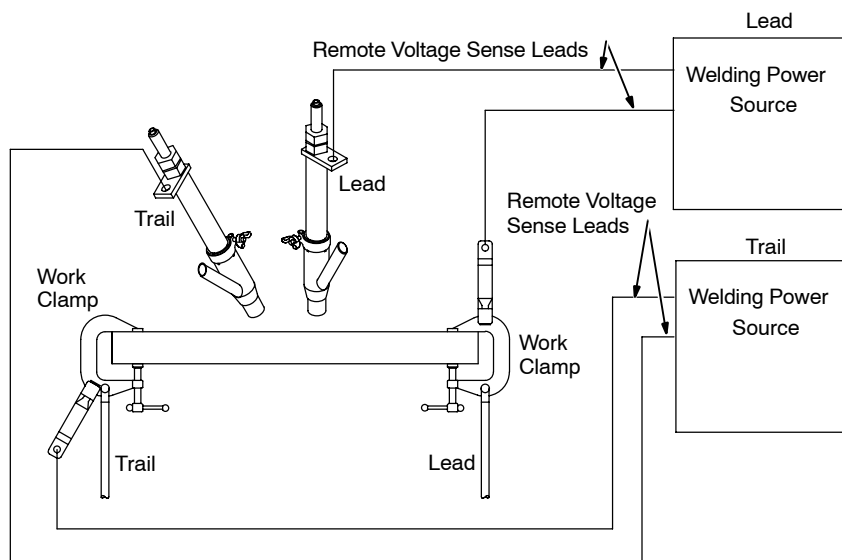


### **BAD**

Current flow from lead affects trail sense.

Current flow from trail affects lead sense.

Neither sense lead picks up the correct work voltage, causing starting and welding arc instability.

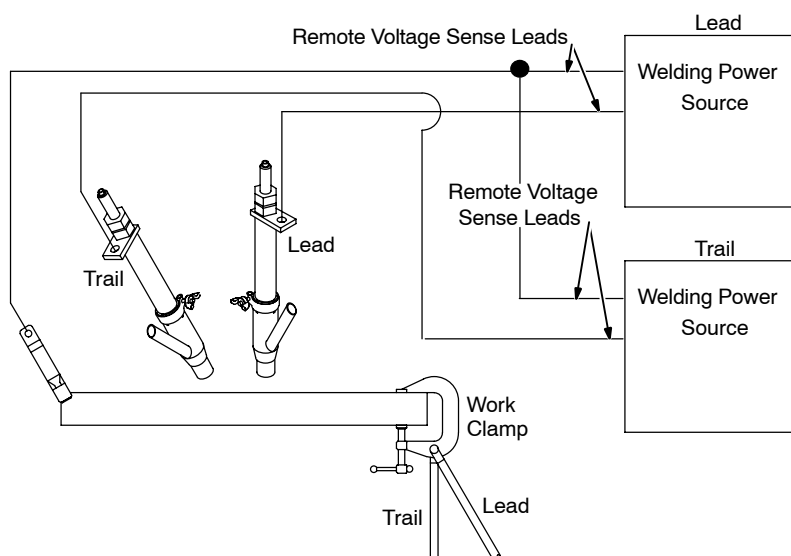


### **BETTER**

Lead sense is only affected by weld current from lead.

Trail sense lead is only affected by weld current from trail.

Due to voltage drops across work piece, arc voltage may be low, causing need for deviation from standard procedures.



### **BEST**

Both sense leads are out of the current paths.

Both sense leads detect arc voltage accurately.

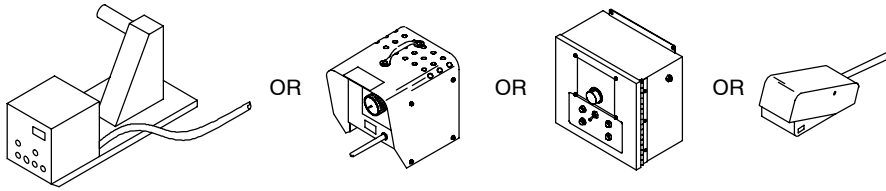
No voltage drop between lead and trail sense.

Best starts, arcs and most reliable results.

### 3-12. Connecting Remote Control



**⚠ Turn Off welding power source and disconnect input power before opening access door.**



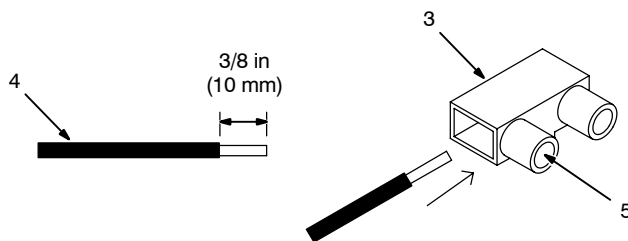
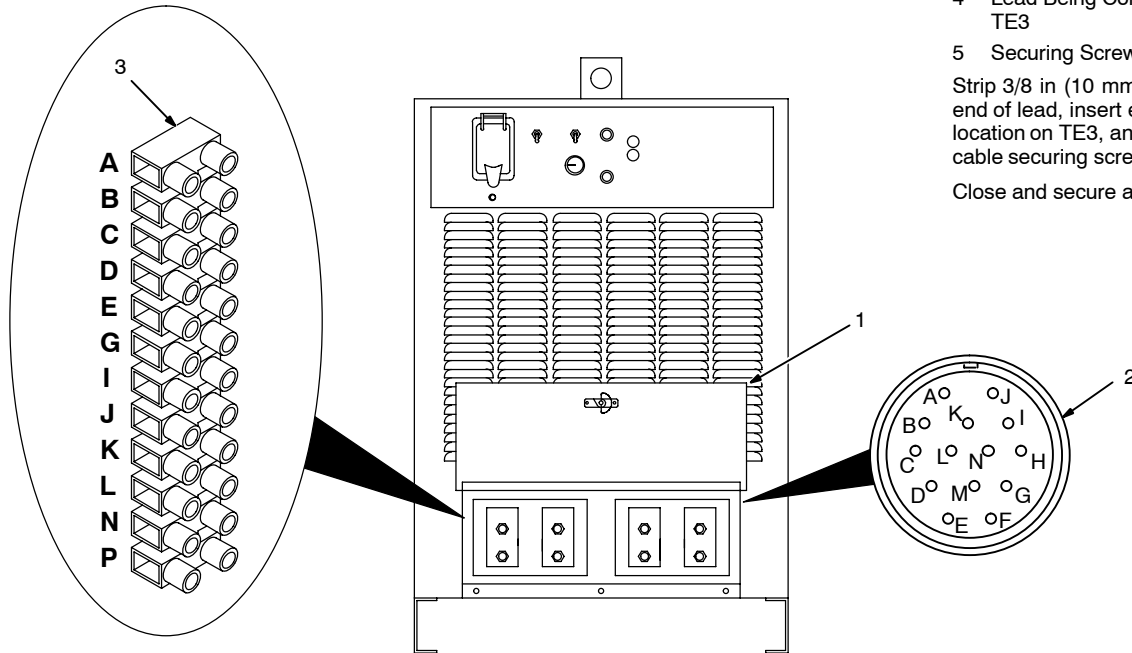
- 1 Access Door
- 2 Remote 14 Receptacle (Mounted Inside Access Area)

Connect remote control to Remote 14 receptacle. If plug does not fit, wire cord to terminal strip TE3 (see Section 3-10 for terminal information).

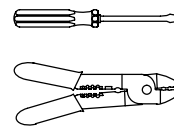
- 3 Terminal Strip TE3 (Mounted Inside Access Area)
- 4 Lead Being Connected To TE3
- 5 Securing Screw

Strip 3/8 in (10 mm) insulation off end of lead, insert end into proper location on TE3, and tighten applicable securing screw.

Close and secure access door.



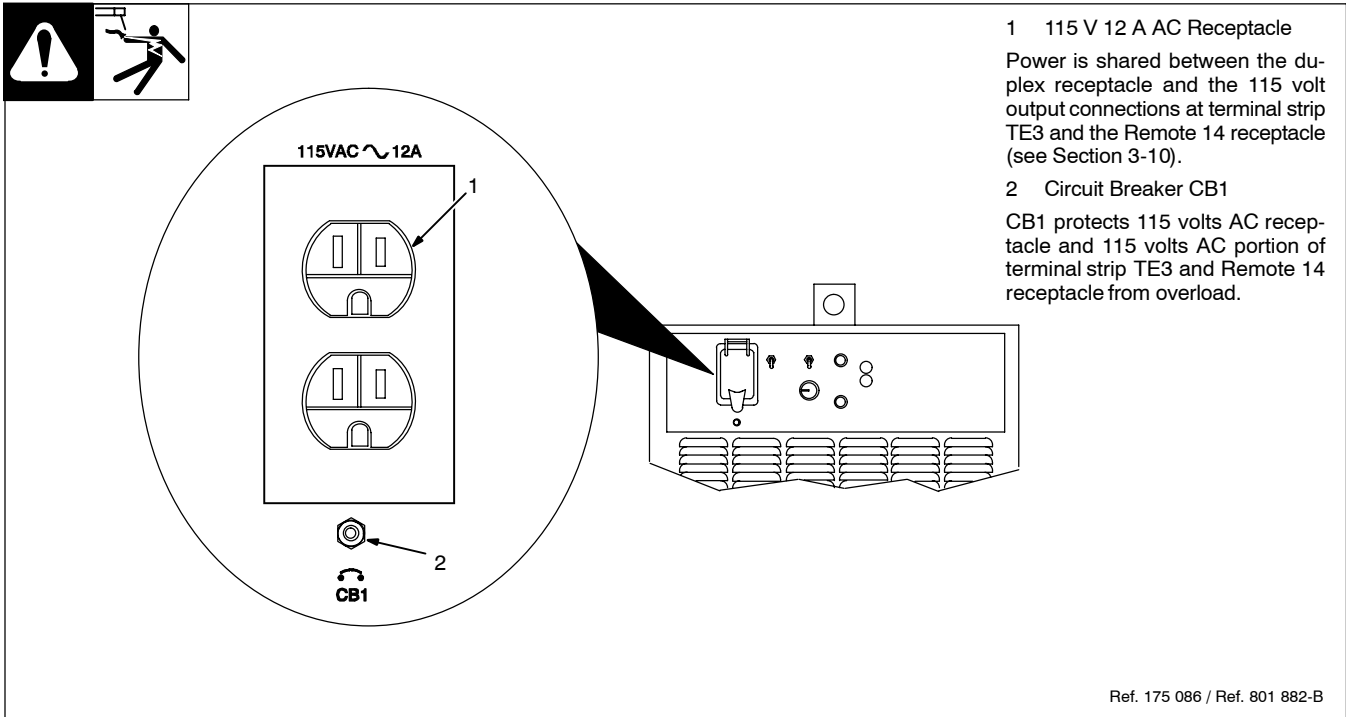
Tools Needed:



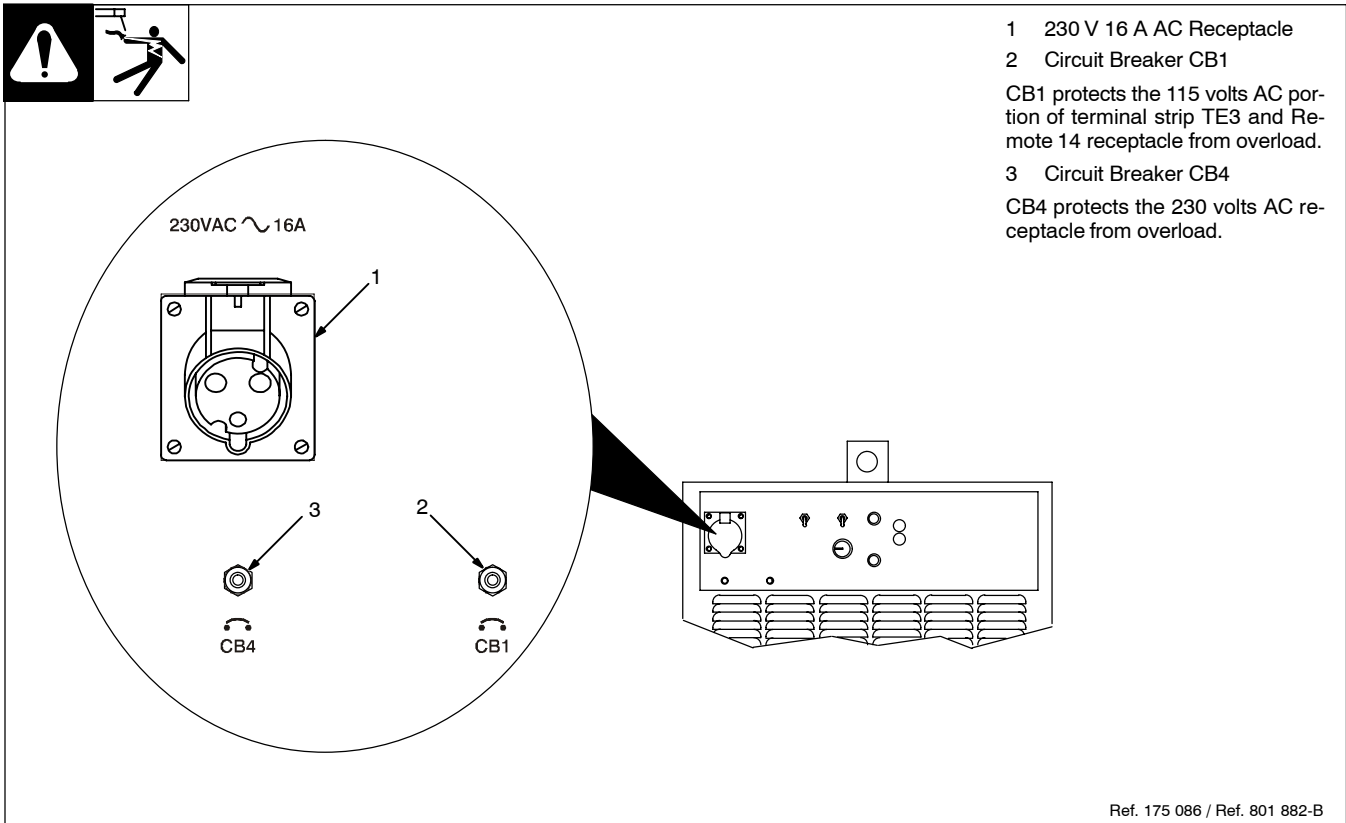
801 882-A



### 3-13. 115 Volts AC Receptacle And Circuit Breaker (460 And 575 Volt Input Models)



### 3-14. 230 Volts AC Receptacle And Circuit Breakers (400 Volt Input Models)



### 3-15. Electrical Service Guide



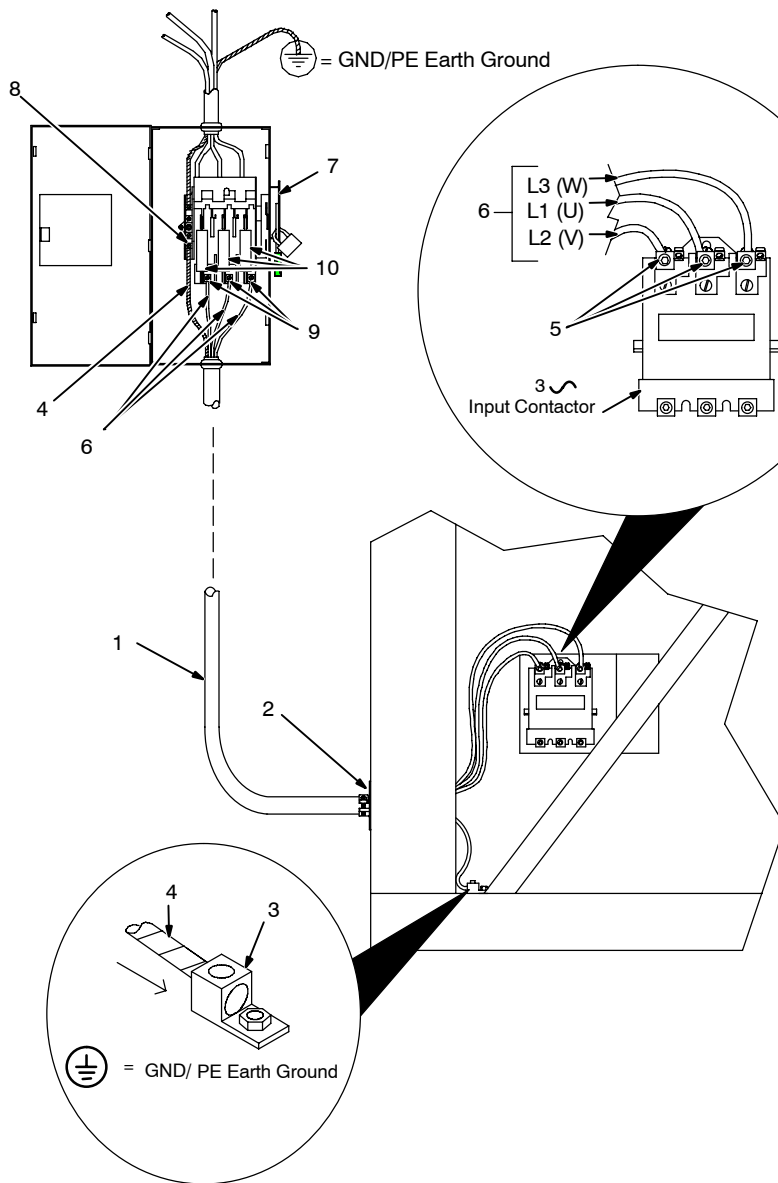
Failure to follow these electrical service guide recommendations could create an electric shock or fire hazard. These recommendations are for a dedicated branch circuit sized for the rated output and duty cycle of the welding power source.

	Three-Phase, 50/60 Hz				Three-Phase, 60 Hz	
<b>Input Voltage</b>	380	400	415	500	460	575
<b>Input Amperes At Rated Output</b>	149	141	136	113	123	98
<b>Max Recommended Standard Fuse Rating In Amperes <sup>1</sup></b>						
<b>Time-Delay <sup>2</sup></b>	175	175	150	125	150	110
<b>Normal Operating <sup>3</sup></b>	225	200	200	175	175	150
<b>Min Input Conductor Size In AWG <sup>4</sup></b>	1/0	1/0	1/0	2	1	3
<b>Max Recommended Input Conductor Length In Feet (Meters)</b>	398 (121)	441 (134)	474 (145)	490 (149)	482 (147)	548 (167)
<b>Min Grounding Conductor Size In AWG <sup>4</sup></b>	4	6	6	6	6	6

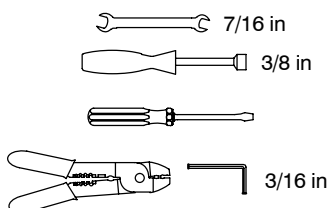
Reference: 2005 National Electrical Code (NEC) (including article 630)

- 1 If a circuit breaker is used in place of a fuse, choose a circuit breaker with time-current curves comparable to the recommended fuse.
- 2 "Time-Delay" fuses are UL class "RK5" .
- 3 "Normal Operating" (general purpose - no intentional delay) fuses are UL class "K5" (up to and including 60 amp), and UL class "H" ( 65 amp and above).
- 4 Conductor data in this section specifies conductor size (excluding flexible cord or cable) between the panelboard and the equipment per NEC Table 310.16. If a flexible cord or cable is used, minimum conductor size may increase. See NEC Table 400.5(A) for flexible cord and cable requirements.

### 3-16. Connecting Input Power



#### Tools Needed:



**⚠ Installation must meet all National and Local Codes – have only qualified persons make this installation.**

**⚠ Disconnect and lockout/tagout input power before connecting input conductors from unit.**

**⚠ Make input power connections to the welding power source first.**

**⚠ Always connect green or green/yellow conductor to supply grounding terminal first, and never to a line terminal.**

**⚠ When using multiple units which will be linked with the synchronizing terminal strip TE4, ensure that primary input power conductors are connected to each unit in the same sequence (L1 to L1, L2 to L2, and L3 to L3.)**

See Section 3-17 for information on testing for proper primary phase sequence.

See rating label on unit and check input voltage available at site.

Remove left side panel.

- 1 Input Power Conductors (Customer Supplied Cord)

Select size and length of conductors using Section 3-15. Conductors must comply with national, state, and local electrical codes. If applicable, use lugs of proper amperage capacity and correct hole size.

#### Welding Power Source Input Power Connections

- 2 Strain Relief

Route conductors (cord) through strain relief and tighten screws.

- 3 Machine Grounding Terminal

- 4 Green Or Green/Yellow Grounding Conductor

Connect green or green/yellow grounding conductor to welding power source grounding terminal first.

- 5 Welding Power Source Line Terminals

- 6 Input Conductors L1 (U), L2 (V) And L3 (W)

Connect input conductors L1 (U), L2 (V) and L3 (W) to welding power source line terminals.

Reinstall left side panel.

#### Disconnect Device Input Power Connections

- 7 Disconnect Device (switch shown in OFF position)

- 8 Disconnect Device (Supply) Grounding Terminal

Connect green or green/yellow grounding conductor to disconnect device grounding terminal first.

- 9 Disconnect Device Line Terminals

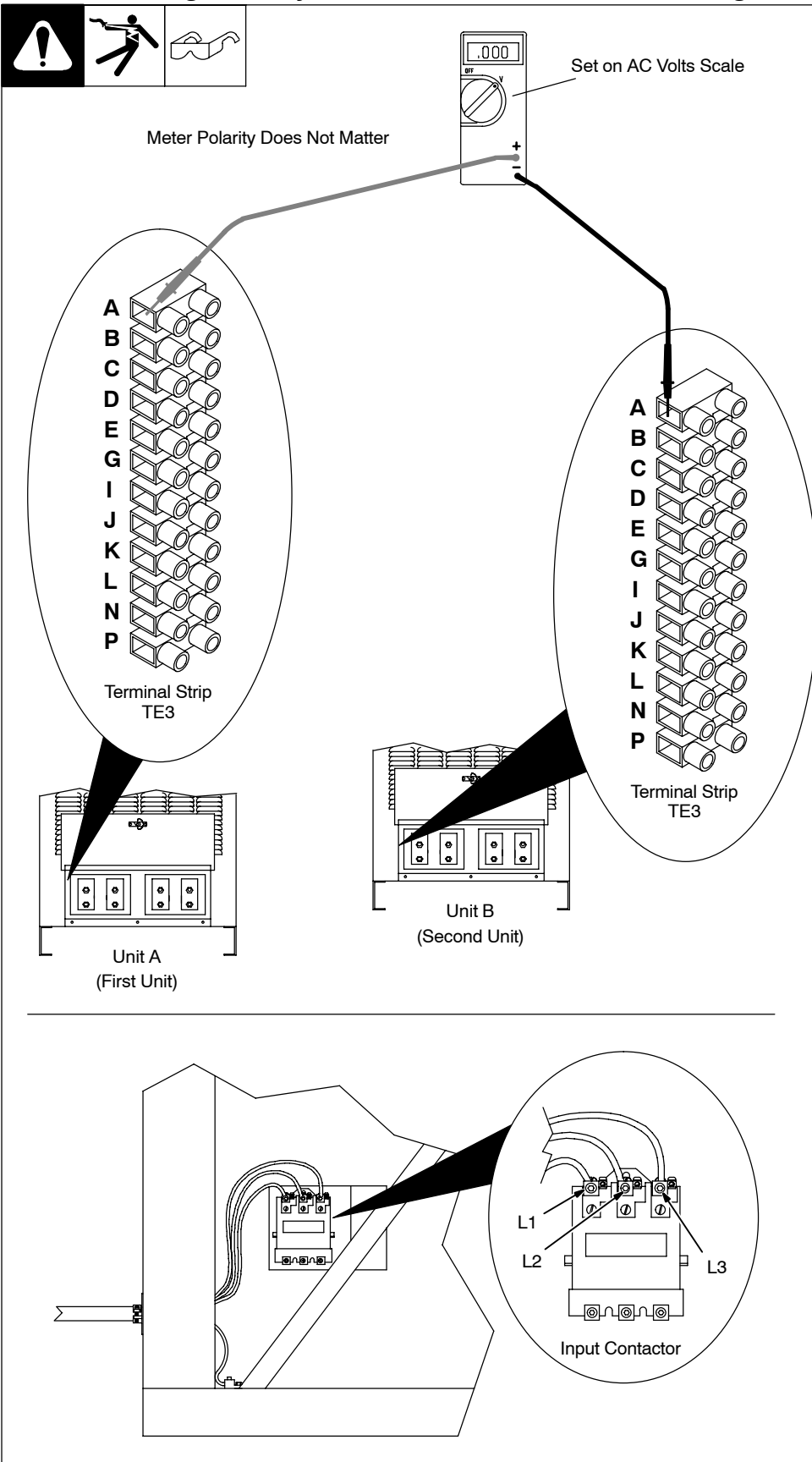
Connect input conductors L1 (U), L2 (V) And L3 (W) to disconnect device line terminals.

- 10 Overcurrent Protection

Select type and size of overcurrent protection using Section 3-15 (fused disconnect switch shown).

Close and secure door on line disconnect device. Remove lockout/tagout device, and place switch in the On position.

### 3-17. Matching Primary Lines L1, L2, And L3 When Using Multiple AC Units



**⚠ Turn Off welding power source and disconnect input power before opening access door.**

This test must be performed on the units that will be interconnected using the synchronizing terminal strip TE4. This refers to the multiple unit hook-ups shown in Sections 4-2 and 4-3.

Power On both units. Using an AC voltmeter, measure the voltage between terminal A of terminal strip TE4. This refers to the multiple unit hook-ups shown in Sections 4-2 and 4-3.

If the measured voltage is approximately 0 (zero) volts, the primary lines are properly phased.

If the measured voltage is approximately 53 volts, swap the input conductor connections to L1 and L3 on the primary input contactor of unit B.

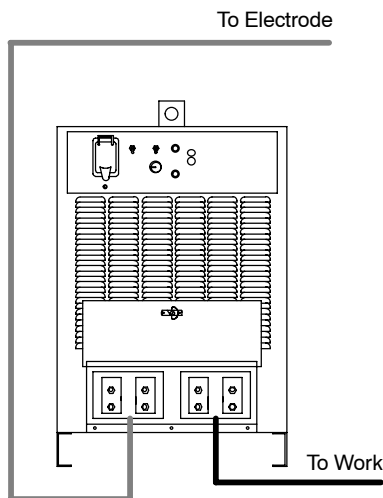
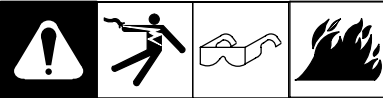
If the measured voltage is approximately 46 volts, swap L1 and L2 on the primary input contactor of unit B. The meter will then read either approximately 53 volts or approximately 26 volts. If the meter reads approximately 53 volts, swap L1 and L3. If the meter reads approximately 26 volts, swap L2 and L3.

If the measured voltage is approximately 26 volts, swap L1 and L2 on the primary input contactor of unit B. The meter will then read either approximately 0 (zero) volts or approximately 46 volts. If the meter reads approximately 0 volts, the primary lines are properly phased. If the meter reads approximately 46 volts, swap L1 and L2 again, and swap L2 and L3.

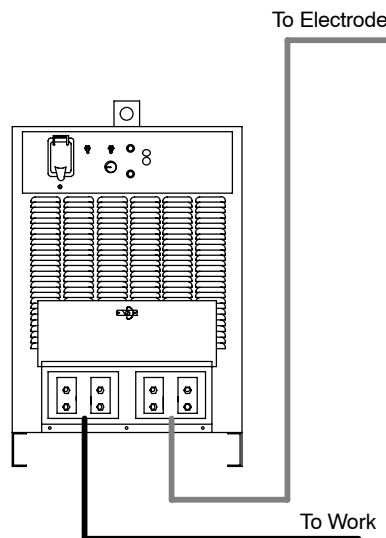
When the second unit's primary line phase sequences are matched with the first unit, test primary phasing between third unit (if applicable) and second unit. Always test and correct phasing between following unit and unit previous to it.

# SECTION 4 – MAKING WELD OUTPUT CONNECTIONS

## 4-1. Work And Electrode Cable Connections For Single DC or AC Arcs



Connections For  
DC Electrode Positive  
Or AC Output



Connections For  
DC Electrode Negative  
Or AC Output

**⚠ Turn Off welding power source and disconnect input power before opening access door.**

**⚠ High weld output current hazard! Remove all metal jewelry, such as rings and watches, and be careful with tools near output terminals. High current can cause severe burns from hot metal if touched to output terminals and unit is On. ALWAYS turn Off welding power sources and disconnect input power BEFORE making weld output connections.**

**⚠ ELECTRIC SHOCK can kill.**

Do not touch live electrical parts.

Turn off welding power sources and disconnect input power before making any weld output connections.

See ANSI Z49.1 and OSHA Title 29, Chapter XVII, Part 1910, Subpart Q (addresses at beginning of manual).

Do not handle or come in contact with two live electrodes at the same time.

**⚠ Undersized weld cables can cause fire.**

Work cable or electrode cable must be able to carry the weld output of the individual welding power source (see Section 3-8).

Do not exceed duty cycle of welding power sources.

**⚠ If there are any questions regarding this procedure, contact the factory before connecting units.**

### For DC electrode positive:

Connect the proper size and number of weld output cables (see Section 3-8) to one of the welding power source electrode terminals.

Connect the proper size and number of ground cables to one of the welding power source work terminals.

### For DC electrode negative:

Connect the proper size and number of weld output cables (see Section 3-8) to one of the welding power source work terminals.

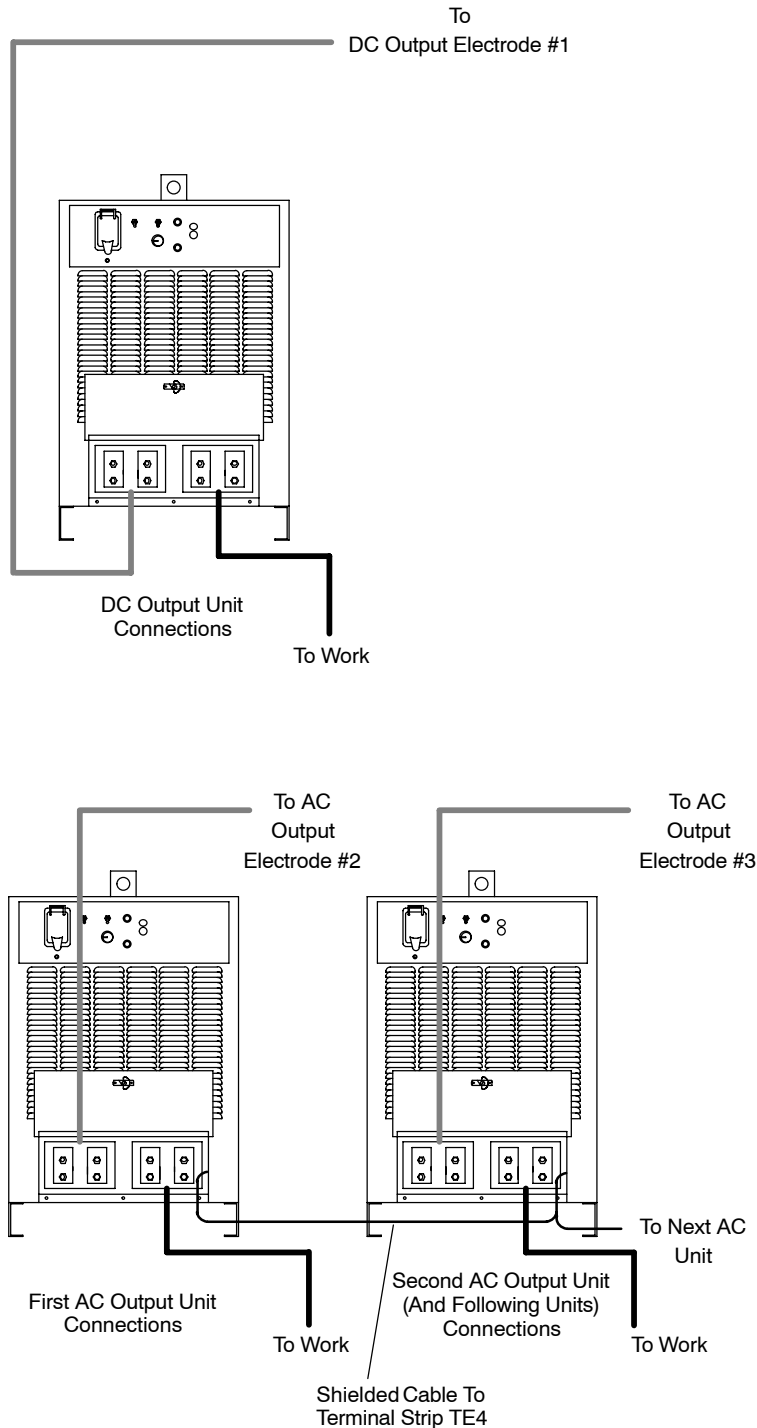
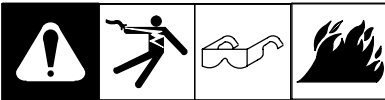
Connect the proper size and number of ground cables to one of the welding power source electrode terminals.

### For AC output:

Connect the proper size and number of weld output cables (see Section 3-8) to one of the welding power source electrode terminals.

Connect the proper size and number of ground cables to one of the welding power source work terminals.

## 4-2. Using Multiple Units: DC Lead Arc, One or More AC Trailing



**⚠ Turn Off welding power source and disconnect input power before opening access door.**

**⚠ High weld output current hazard! Remove all metal jewelry, such as rings and watches, and be careful with tools near output terminals. High current can cause severe burns from hot metal if touched to output terminals and unit is On. ALWAYS turn Off welding power sources and disconnect input power BEFORE making weld output connections.**

**⚠ Electric shock can kill.**

Do not touch live electrical parts.

Turn off welding power sources and disconnect input power before making any weld output connections.

See ANSI Z49.1 and OSHA Title 29, Chapter XVII, Part 1910, Subpart Q (addresses at beginning of manual).

Do not handle or come in contact with two live electrodes at the same time.

**⚠ Undersized weld cables can cause fire.**

Work cable or electrode cable must be able to carry the weld output of the individual welding power source (see Section 3-8).

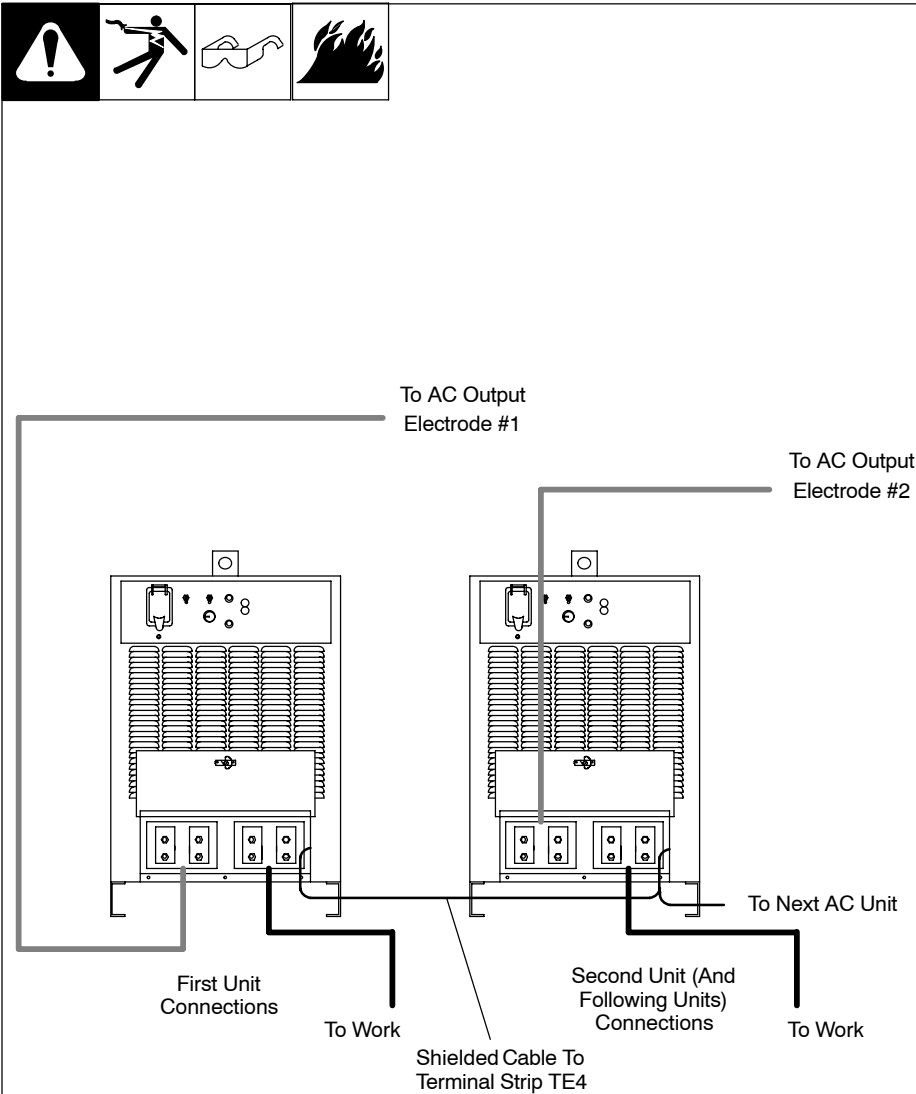
Do not exceed duty cycle of welding power sources.

**⚠ If there are any questions regarding this procedure, contact the factory before connecting units.**

To use a DC electrode positive lead arc with one or more trailing AC arcs, make connections as shown.

When running more than one AC trailing arc, set up the AC units according to Section 4-4.

### 4-3. Using Multiple Units: Two or More AC Arcs



**⚠ Turn Off welding power source and disconnect input power before opening access door.**

**⚠ High weld output current hazard! Remove all metal jewelry, such as rings and watches, and be careful with tools near output terminals. High current can cause severe burns from hot metal if touched to output terminals and unit is On. ALWAYS turn Off welding power sources and disconnect input power BEFORE making weld output connections.**

**⚠ ELeetric Shock can kill.**

Do not touch live electrical parts.

Turn off welding power sources and disconnect input power before making any weld output connections.

See ANSI Z49.1 and OSHA Title 29, Chapter XVII, Part 1910, Subpart Q (addresses at beginning of manual).

Do not handle or come in contact with two live electrodes at the same time.

**⚠ Undersized weld cables can cause fire.**

Work cable or electrode cable must be able to carry the weld output of the individual welding power source (see Section 3-8).

Do not exceed duty cycle of welding power sources.

**⚠ If there are any questions regarding this procedure, contact the factory before connecting units.**

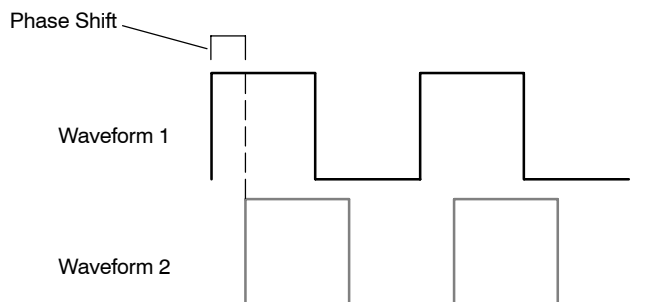
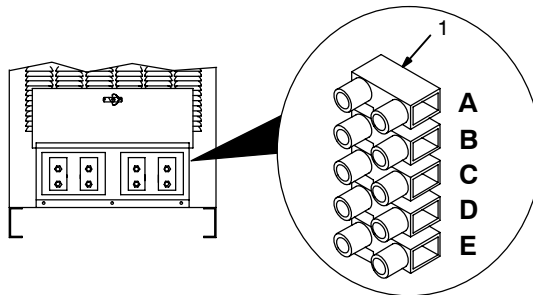
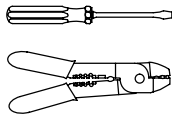
To use two or more AC arcs with separate electrodes, make connections as shown.

Set up AC output units according to Section 4-4.

## 4-4. Using AC Arcs Terminal Strip TE4 Connections

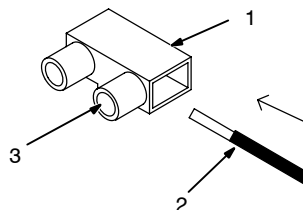


Tools Needed:



AC Waveforms

Use two-conductor (12 to 20 gauge) with uninsulated ground, shielded cable to make TE4 connections. Connect uninsulated ground wire to terminal C on TE4.



**Turn Off** welding power source and disconnect input power before opening access door.

DC output units do not require synchronization with AC output units.

If there are any questions regarding this procedure, contact the factory before connecting units.

### 1 Terminal Strip TE4

This procedure allows the AC output waveforms of two or more units to have a phase shift. Make connections between terminal strip TE4 on applicable AC output units as shown in illustration.

Do not disturb factory connections to terminal strip TE4.

Ensure that primary input power conductors are connected to each unit in the same sequence (L1 to L1, L2 to L2, and L3 to L3). See Section 3-16 for information on connecting input power. See Section 3-17 for information on testing for proper primary phase sequence.

### 2 Lead Being Connected To TE4

### 3 Securing Screw

Strip 3/8 in (10 mm) insulation off end of lead, insert end into proper location on TE4, and tighten applicable securing screw.

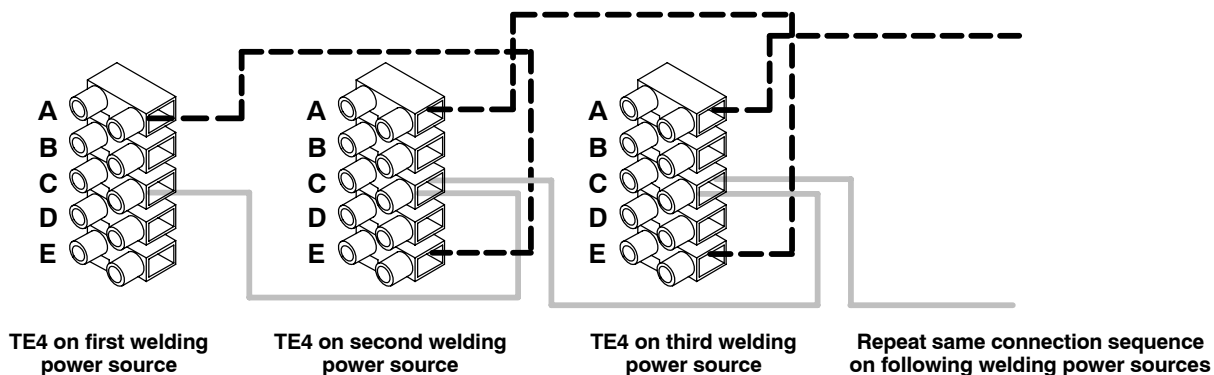
Close and secure access door.

Connect plug as shown in Section 4-5.

Connections from first to second welding power source:  
terminal A to terminal E,  
terminal C to terminal C

Connections from second to third welding power source:  
terminal A to terminal E,  
terminal C to terminal C

Connections from third to fourth welding power source:  
terminal A to terminal E,  
terminal C to terminal C

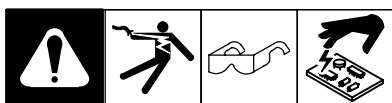


Terminal Strip TE4 Connections For Running Multiple AC Arcs

Ref. 801 882-A



## 4-5. Control Board PC1 Connections



**⚠** Turn Off welding power source and disconnect input power before following this procedure.

**⚠** If there are any questions regarding this procedure, contact the factory before connecting units.

Remove top cover.

1 Front Panel

2 Control Board PC1

PC1 is mounted on inside of control panel.

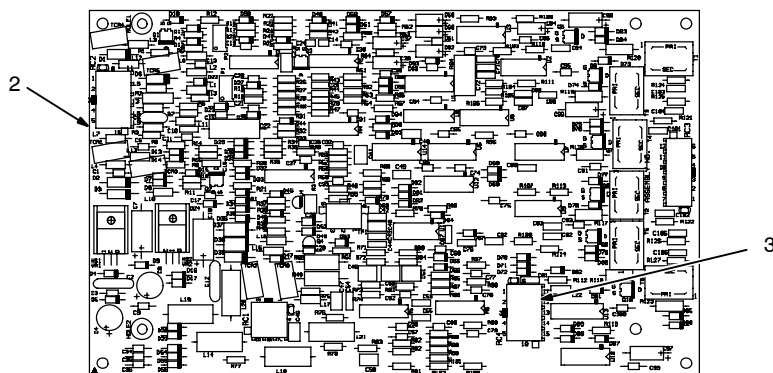
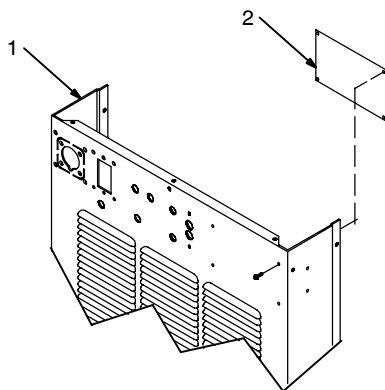
3 Receptacle RC4

PC1 arrives from the factory with a 66/34 plug.

Plugs are labeled accordingly.

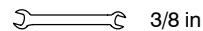
*☞ Always keep disconnected plug for future use.*

Reinstall circuit card cover and top cover.



PC1 Viewed From Rear Of Unit

Tools Needed:



Ref. 801 982-A

# SECTION 5 – OPERATION

## 5-1. Front Panel Controls (Non-CE Models)



### 1 Output Control Switch

For weld output, place switch in On position. For remote control of output, make connections to terminal strip TE3 or Remote 14 receptacle (see Section 3-10) and place switch in Remote position.

### 2 A/V (Amperage/Voltage) Control Switch

For front panel control, place switch in Panel position and use the A/V Adjust control.

**⚠ Turn Off power before connecting remote device.**

For remote control, connect remote device to terminal strip TE3 or Remote 14 receptacle, and place switch in Remote position. Remote control provides full range of unit output regardless of A/V Adjust control setting

### 3 Pilot Light

### 4 Power Push Button Switch

*The fan motor is thermostatically controlled and only runs when cooling is needed.*

### 5 High Temperature Shutdown Light

Lights if welding power source overheats.

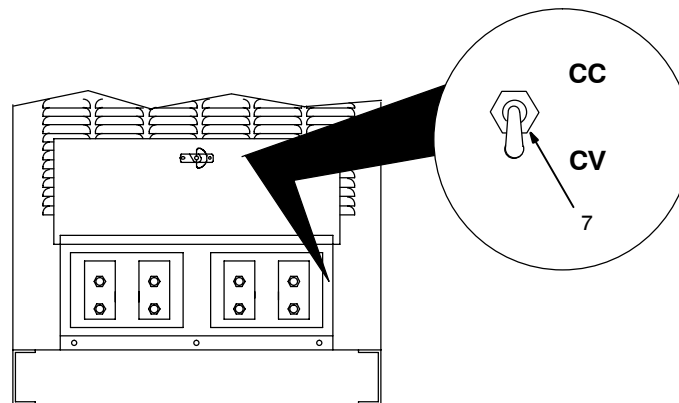
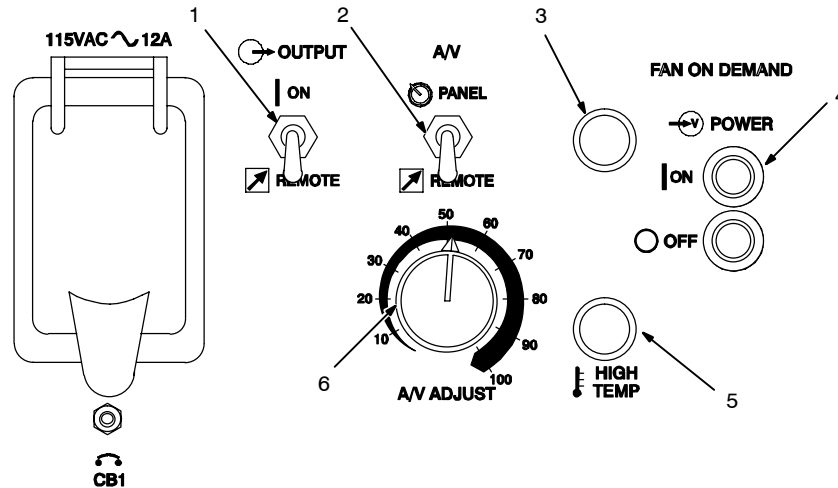
### 6 A/V (Amperage/Voltage) Adjustment Control

Use control to select weld voltage or amperage. Control may be adjusted while welding. Numbers on scale are for reference only.

### 7 CC/CV Switch (Mounted Inside Access Area)

**⚠ Turn Off welding power source before opening access door to change switch position.**

Place switch in desired position.



## 5-2. Front Panel Controls (CE Models)



### 1 Output Control Switch

For weld output, place switch in On position. For remote control of output, make connections to terminal strip TE3 or Remote 14 receptacle (see Section 3-10) and place switch in Remote position.

### 2 A/V (Amperage/Voltage) Control Switch

For front panel control, place switch in Panel position and use the A/V Adjust control.

**⚠ Turn Off power before connecting remote device.**

For remote control, connect remote device to terminal strip TE3 or Remote 14 receptacle, and place switch in Remote position. Remote control provides full range of unit output regardless of A/V Adjust control setting

### 3 Pilot Light

### 4 Power Push Button Switch

**ⓘ The fan motor is thermostatically controlled and only runs when cooling is needed.**

### 5 High Temperature Shutdown Light

Lights if welding power source overheats.

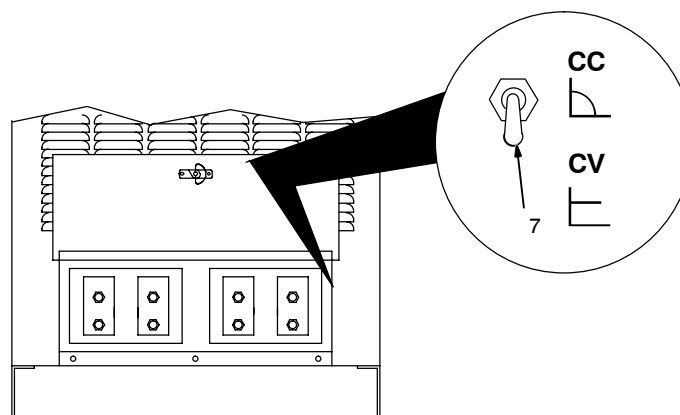
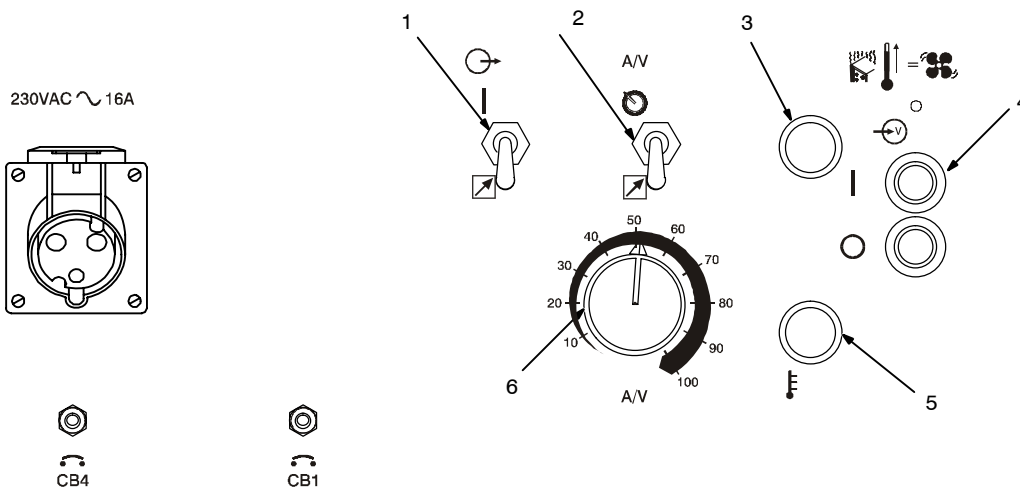
### 6 A/V (Amperage/Voltage) Adjustment Control

Use control to select weld voltage or amperage. Control may be adjusted while welding. Numbers on scale are for reference only.

### 7 CC/CV Switch (Mounted Inside Access Area)

**⚠ Turn Off welding power source before opening access door to change switch position.**

Place switch in desired position.



Ref. 175 086 / Ref. 801 882-A

# SECTION 6 – MAINTENANCE AND TROUBLESHOOTING

## 6-1. Routine Maintenance

					<b>Disconnect input power before maintaining.</b>	<i>Maintain more often during severe conditions.</i>
	✓ = Check * To be done by Factory Authorized Service Agent	◇ = Change	● = Clean	Δ = Repair	★ = Replace	
Every 3 Months						✓★ Labels ★ Cracked Parts Δ ★ Cracked Cables
Every 3 Months						✓Δ ★ Cables And Cords
Every 3 Months						●:Weld Terminals
Every 6 Months						●:Blow out inside

## 6-2. Fuses F1 And F2

Rear of Unit

**⚠ Turn Off welding power source and disconnect input power before checking fuse.**

Fuses F1 and F2 protect the 115 volt AC winding of transformer T2. If fuse F1 or F2 opens, the welding power source shuts down.

Remove top cover from unit to access fuses.

1 Fuse F1

Check F1 and replace if needed, using a fuse of the same rating.

2 Fuse F2

Check F2 and replace if needed, using a fuse of the same rating.

Use proper tool when removing fuses.




Reinstall top cover.

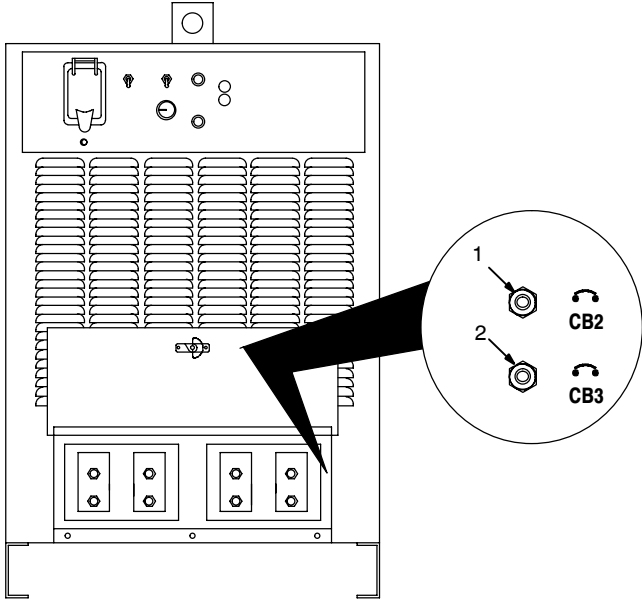
**Tools Needed:**

3/8 in

Ref. 801 883-B

### 6-3. Access Area Supplementary Protectors



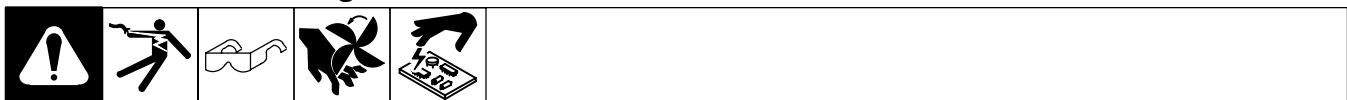
**⚠ Turn Off welding power source and disconnect input power before checking circuit breakers.**

- 1 Supplementary Protector CB2  
CB2 protects the 24 VAC portion of terminal strip TE3 and the Remote 14 receptacle.
- 2 Supplementary Protector CB3  
CB3 protects the 42 VAC portion of terminal strip TE3.

Press button to reset breaker.

Ref. 175 086 / 801 882-A

### 6-4. Troubleshooting



Trouble	Remedy
No weld output; unit completely in-operative.	Place line disconnect switch in On position (see Section 3-16).
	Check fuses F1 and F2 and replace if necessary (see Section 6-2).
	Check and replace line fuse(s), if necessary, or reset circuit breaker (see Section 3-16).
	Check for proper input power connections (see Section 3-16).
No weld output; pilot light On.	Check, repair, or replace remote control.
	Unit overheated. Allow unit to cool with fan On (see Section 3-2).
	Have Factory Authorized Service Agent check control board PC1.
Erratic or improper weld output.	Use proper size and type of weld cable (see Section 3-8).
	Clean and tighten all weld connections.
	When using multiple units, make sure all units connected with terminal strip TE4 are turned on.
	Have Factory Authorized Service Agent check control board PC1.
No 115 volts AC output at duplex receptacle, terminal strip TE3, and Remote 14 receptacle.	Reset supplementary protector CB1 (see Section 3-13).
No 230 volts AC output at duplex receptacle.	Reset supplementary protector CB4 (see Section 3-14).
No 24 volts AC output at terminal strip TE3 and Remote 14 receptacle.	Reset supplementary protector CB2 (see Section 6-3).
No 42 volts AC output at terminal strip TE3.	Reset supplementary protector CB3 (see Section 6-3).

## 224 360-A



WARNING: CIRCUIT IS THE SAME FOR 400V AND 300V MODELS. USE ONLY INPUT VOLTAGE STATED ON RATING LABEL.

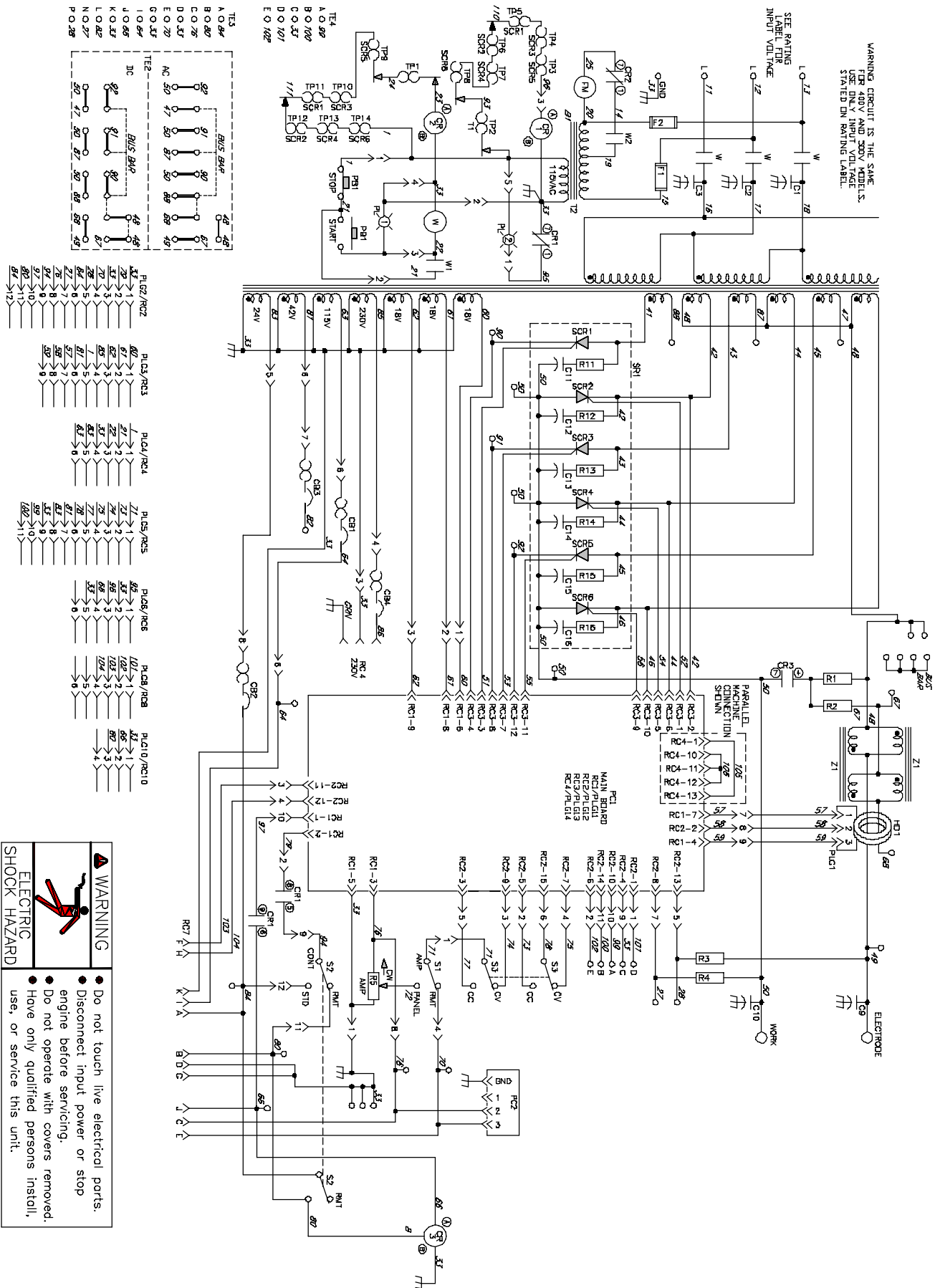
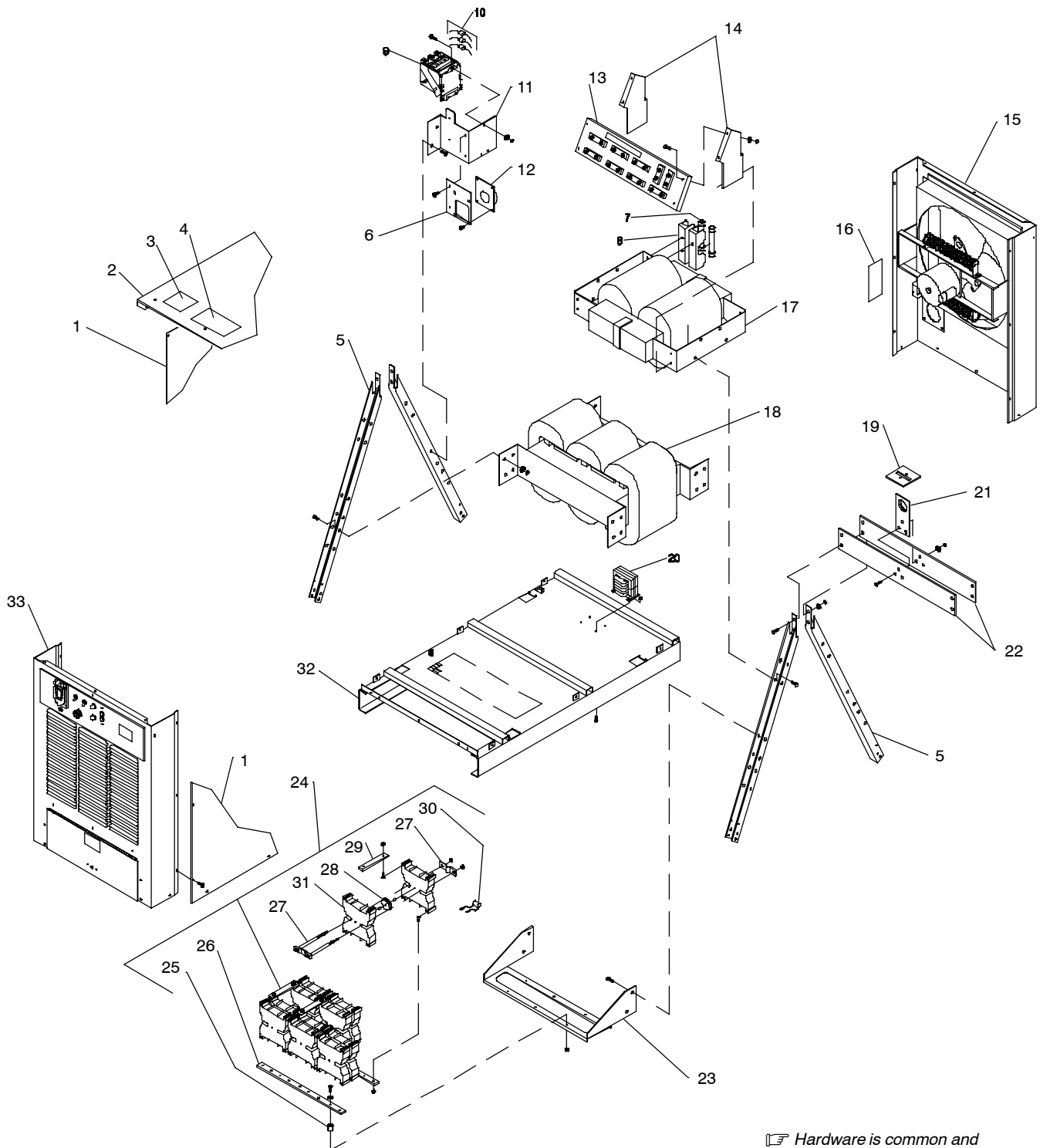



Figure 7.2. Circuit Diagram For 400 VAC Input Models

# SECTION 8 – PARTS LIST



 Hardware is common and not available unless listed.

801 981-B

**Figure 8-1. Main Assembly**

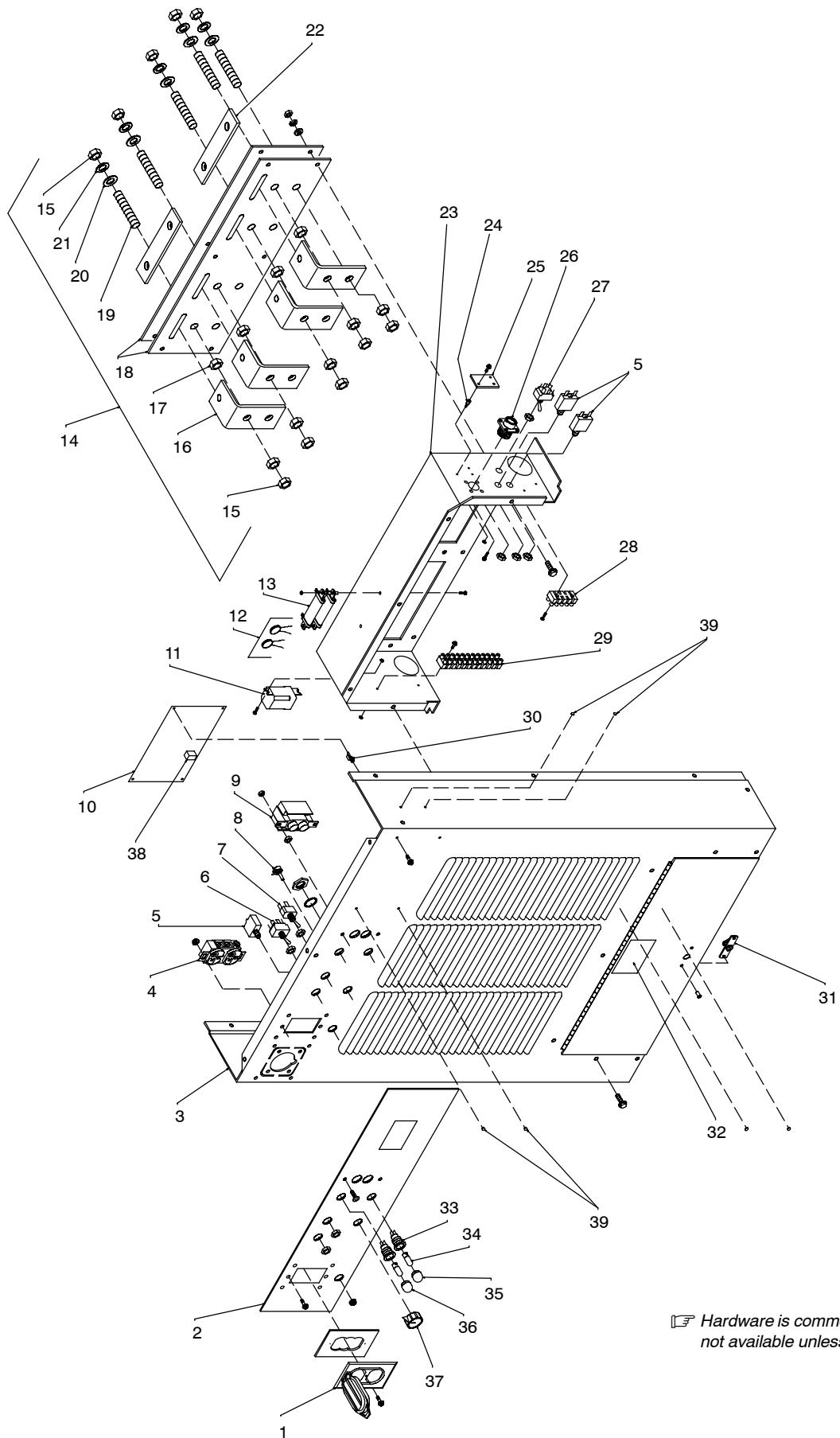


Item No.	Dia. Mkgs.	Part No.	Description	Quantity
<b>Figure 8-1. Main Assembly</b>				
1		071 624	Panel, Side	2
2		+070 555	Cover, Top	1
3		217 136	Label,Warning Electric Shock	1
4		217 862	Label,Warning Electric Shock And AC/DC Lkg	1
5		184 340	Channel, Upright	4
6		188 403	Bracket, Mtg Lem	1
7	F1,F2	*012 639	Fuse, Crtg 6A 600 V	2
8		070 404	Fuse, Holder	2
9	W	099 044	Contactor, Size 3-1/2 3P	1
	W1,2	213 446	Interlock, Cntor No. Size 3-1/2	2
10	C1-3	219 496	Capacitor (All Models)	3
11		184 349	Bracket, Mtg Contactor	1
12	HD1	148 417	Transducer, Current 1000A	1
	PLG1	130 204	Connector & Socket	1
13	TE2	213 419	Terminal Assembly, Pwr Output	1
14		184 359	Bracket, Mtg Terminal Assembly	2
15		Fig 8-3	Rear Panel Assembly	1
16		217 860	Label,Warning Electric Shock And Input Pwr	1
17	Z1	184 350	Stabilizer	1
18	T1	184 406	Transformer, Pwr Main (460 Model)	1
18	T1	188 222	Transformer, Pwr Main (575 Model)	1
18	T1	185 360	Transformer, Pwr Main (400 50/60Hz Model)	1
	TP2	216 600	Thermostat, NC Open 150° C W/Insulator Leads & Terms	1
	TP1	168 891	Thermostat, NC In Trans. 80° C Fan On Demand	1
19		184 344	Stop, Cover	1
		026 627	Gasket, Lift Eye	1
20	T2	094 237	Transformer, KVA 1/2 115-230/460 (460 Model)	1
20	T2	096 145	Transformer, KVA 1/2 115-230/575 (575 Model)	1
20	T2	185 359	Transformer, KVA 1/2 115-220/400 (400 50/60Hz Model)	1
21		184 342	Lift, Eye	1
22		184 341	Bar, Cross Lift Eye	2
23		184 345	Bracket, Rectifier	1
24	SR1	213 441	Rectifier, Scr Main (Consisting Of)	1
25		026 947	Stand-Off, Insul .250-20 X 1.000 Lg	3
26		185 206	Strip, Mtg Rectifier	2
27		196 496	Clamp, Thyristor Rectifier 4.750	6
28	SCR1-6	148 091	Thyristor, Scr 865 A 300 V	6
29		185 207	Strip, Spacing Heat Sink	3
		082 852	Bus Bar, Output Rectifier	2
30	C11-16/			
	R11-16	185 183	Capacitor/Resistor	6
	TP3, 4, 5			
	6, 7, 8	192 732	Thermostat, NC Open 203° F In Sr1 Overload	6
	TP9, 10,			
11, 12, 13, 14		168 900	Thermostat, NC Open 125° F Close 105° F No Flange Fasto	6
31		191 248	Heat Sink, Rectifier Snowflake	12
32		184 343	Base	1
33		Fig 8-2	Front Panel Assembly	1

+When ordering a component originally displaying a precautionary label, the label should also be ordered.

\*Recommended Spare Parts.

**To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.**



Hardware is common and not available unless listed.

Figure 8-2. Front Panel Assembly

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
<b>Figure 8-2. Front Panel Assembly (Figure 8-1 Item 32)</b>				
1		038 805	Cover, Receptacle Weatherproof	1
2			Nameplate, (Order By Model And Serial Number)	1
3		+187 759	Panel, Front	1
4	RC1	604 176	Receptacle, Str Dx Grd 2P3W 15A 125V (460 & 575 Models)	1
4	RC1	176 355	Receptacle, Str 2P3W 16A 220V (400 50/60Hz Model)	1
5	CB1-3	093 995	SUPPLEMENTARY PROTECTOR, Man Reset 1P 15A 250VAC Fric (460 & 575 Models)	3
5	CB1-4	093 995	SUPPLEMENTARY PROTECTOR, Man Reset 1P 15A 250VAC Fric (400 50/60Hz Model)	4
6	S2	011 611	Switch, Tgl DPDT 15A 125VAC On-None-On Spd Term Chr	1
7	S1	011 609	Switch, Tglspdt 15A 125VAC	1
8	R5	030 109	Potentiometer, Cp Std Slot 1/T 2W 5K Linear	1
9	PB1	011 636	Switch, Pushbutton	1
10	PC1	222 424	Circuit Card, Control (460 & 575 Models)	1
10	PC1	227 718	Circuit Card, Control (400 50/60Hz Model)	1
	PLG11	163 467	Connector & Sockets	1
	PLG12	152 249	Connector & Sockets	1
	PLG13	158 720	Connector & Sockets	1
11	CR1	039 498	Relay, Encl 120 VAC 3PDT 10A	1
12	C9,10	130 710	Capacitor Assembly	2
13	R3,4	136 076	Resistor, Ww Fxd 30W 200 Ohm	2
14		059 567	Terminal, Pwr Output (Consisting Of)	1
15		601 841	Nut, Brs Hex Jam .625-11	16
16		038 032	Bus Bar, Neg And Pos Sec	4
		208 935	Terminal, Hammer On 3/0 – 4/0	1
17		601 842	Nut, Brs Hex Full .625-11	8
18		059 566	Terminal Board, Pwr Output	2
19		038 909	Stud, Brs .625-11 X 3.000	8
20		602 249	Washer, Flat Stl Sae .625	8
21		602 219	Washer, Lock Stl External Tooth .625	8
22		059 983	Bus Bar, Jumper Secondary	2
23		188 514	Bracket, Mtg Term Assy	1
24		110 375	Stand-Off, Support PC Card	3
25	PC2	148 030	Circuit Card, Filter	1
26	RC7	134 735	Connector, Circ Ms/Cpc 14 Skt	1
27	S3	011 611	Switch, Tgl DPDT 15A 125 VAC	1
28	TE4	192 357	Block, Term 40A 5P	1
29	TE3	188 719	Block, Term 40A 12P	1
30		098 691	Stand-Off, No. 6-32 X .500	4
31		605 583	Catch, Spr Loaded Door	1
32		217 861	Label, Warning Electric Shock Can Kill Etc	1
33		027 631	Housing, Light Ind	2
34	PL1,2	027 629	Bulb, Incand	2
35		182 704	Lens, Light Ind White	1
36		176 246	Lens, Light Ind Amber	1
37		097 924	Knob, Pointer	1
38		209 319	Kit, Variable Balance	1
39		117 860	Blank, Snap-In Nyl .187 Mtg Hole Black	4

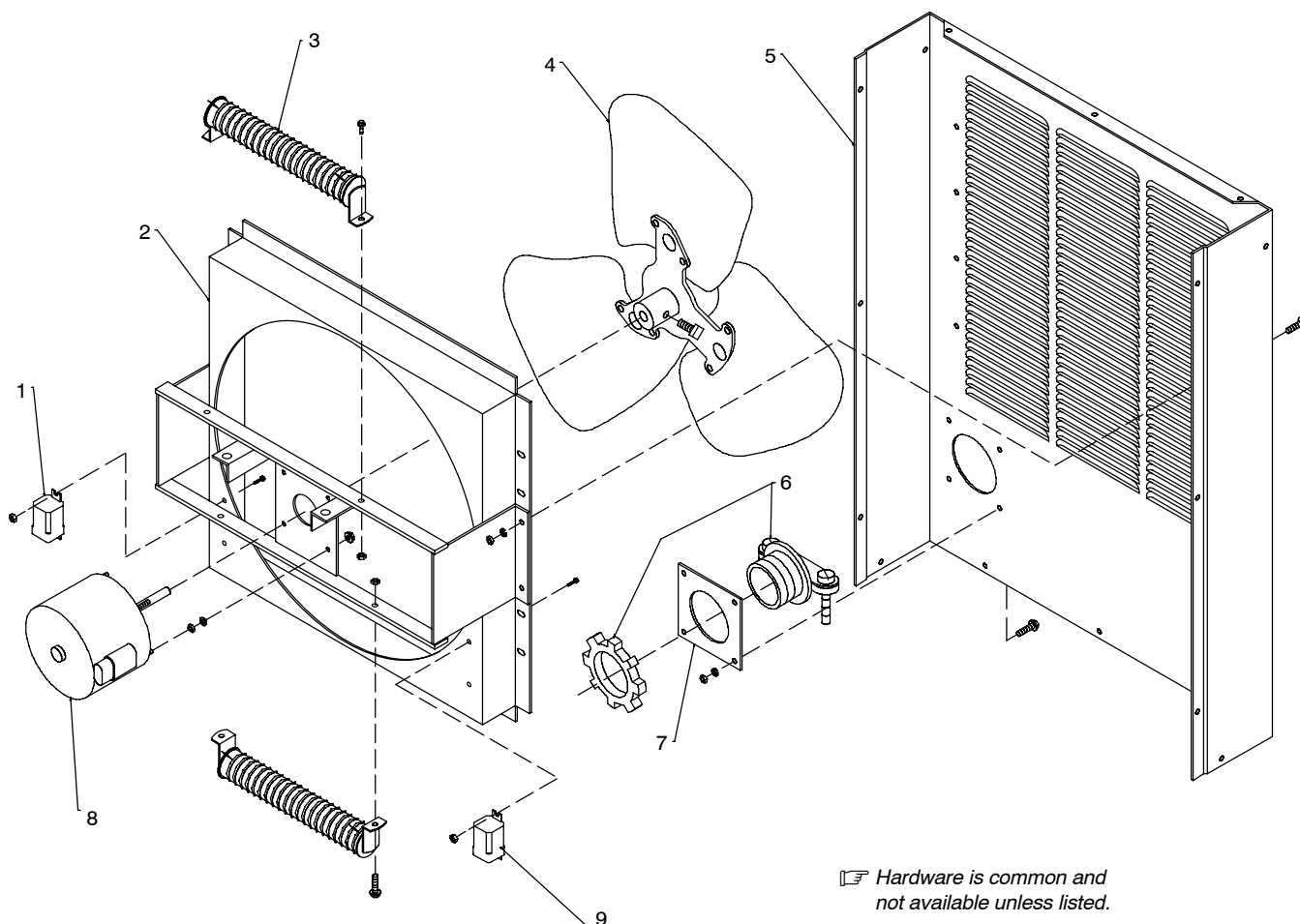
+When ordering a component originally displaying a precautionary label, the label should also be ordered.

**To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.**

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
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**Figure 8-3. Rear Panel Assembly (Figure 8-1 Item 15)**

...	1	CR2	...	059 266	..	Relay, Encl 120 VAC DPDT 10A/120 VAC	.....	1
...	2			222 352	..	Windtunnel, 20In	.....	1
...	3	R1,2	...	097 459	..	Resistor, WW Fxd 375W 20 Ohm	.....	2
...	4			222 347	..	Blade, Fan 20.000 3Wg 13Deg .500 Bore Cw Al	.....	1
...	5			+070 558	..	Panel, Rear	.....	1
...	6			183 167	..	Connector, Clamp Cable 2.000	.....	1
...	7			102 207	..	Plate, Adapter Power Cord	.....	1
...	8	FM	...	032 605	..	Motor, Cap Perm Sp 1/4Hp 230 VAC 1625RPM	.....	1
...	9	CR3	...	188 184	..	Relay, Encl 24/120VAC DPDT 5A/120VAC 9Pin Flange	.....	1



801 983-A

**Figure 8-3. Rear Panel Assembly**

+When ordering a component originally displaying a precautionary label, the label should also be ordered.

**To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.**

# TRUE BLUE® WARRANTY

Effective January 1, 2008

(Equipment with a serial number preface of LJ or newer)

This limited warranty supersedes all previous Miller warranties and is exclusive with no other guarantees or warranties expressed or implied.

## Warranty Questions?

Call  
1-800-4-A-MILLER  
for your local  
Miller distributor.

Your distributor also gives  
you ...

### Service

You always get the fast,  
reliable response you  
need. Most replacement  
parts can be in your  
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### Support

Need fast answers to the  
tough welding questions?  
Contact your distributor.  
The expertise of the  
distributor and Miller is  
there to help you, every  
step of the way.

**LIMITED WARRANTY** – Subject to the terms and conditions below, Miller Electric Mfg. Co., Appleton, Wisconsin, warrants to its original retail purchaser that new Miller equipment sold after the effective date of this limited warranty is free of defects in material and workmanship at the time it is shipped by Miller. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

Within the warranty periods listed below, Miller will repair or replace any warranted parts or components that fail due to such defects in material or workmanship. Miller must be notified in writing within thirty (30) days of such defect or failure, at which time Miller will provide instructions on the warranty claim procedures to be followed.

Miller shall honor warranty claims on warranted equipment listed below in the event of such a failure within the warranty time periods. All warranty time periods start on the delivery date of the equipment to the original end-user purchaser, and not to exceed one year after the equipment is shipped to a North American distributor or eighteen months after the equipment is shipped to an International distributor.

1. 5 Years Parts — 3 Years Labor
  - \* Original main power rectifiers only to include SCRs, diodes, and discrete rectifier modules
2. 3 Years — Parts and Labor
  - \* Transformer/Rectifier Power Sources
  - \* Plasma Arc Cutting Power Sources
  - \* Process Controllers
  - \* Semi-Automatic and Automatic Wire Feeders
  - \* Inverter Power Sources (Unless Otherwise Stated)
  - \* Water Coolant Systems (Integrated)
  - \* Intellitig
  - \* Engine Driven Welding Generators  
(NOTE: Engines are warranted separately by the engine manufacturer.)
3. 1 Year — Parts and Labor Unless Specified
  - \* Motor Driven Guns (w/exception of Spoolmate Spoolguns)
  - \* Positioners and Controllers
  - \* Automatic Motion Devices
  - \* RFCS Foot Controls
  - \* Induction Heating Power Sources, Coolers, and Electronic Controls/Recorders
  - \* Water Coolant Systems (Non-Integrated)
  - \* Flowgauge and Flowmeter Regulators (No Labor)
  - \* HF Units
  - \* Grids
  - \* Spot Welders
  - \* Load Banks
  - \* Arc Stud Power Sources & Arc Stud Guns
  - \* Racks
  - \* Running Gear/Trailers
  - \* Plasma Cutting Torches (except APT & SAF Models)
  - \* Field Options  
(NOTE: Field options are covered under True Blue® for the remaining warranty period of the product they are installed in, or for a minimum of one year — whichever is greater.)
  - \* Bernard-Branded Mig Guns (No Labor)
  - \* Weldcraft-Branded TIG Torches (No Labor)
  - \* Subarc Wire Drive Assemblies
4. 6 Months — Batteries
5. 90 Days — Parts
  - \* MIG Guns and Subarc (SAW) Guns

- \* Induction Heating Coils and Blankets, Cables, and Non-Electronic Controls
- \* APT & SAF Model Plasma Cutting Torches
- \* Remote Controls
- \* Accessory (Kits)
- \* Replacement Parts (No labor)
- \* Spoolmate Spoolguns
- \* Canvas Covers

Miller's True Blue® Limited Warranty shall not apply to:

1. **Consumable components; such as contact tips, cutting nozzles, contactors, brushes, slip rings, relays or parts that fail due to normal wear. (Exception: brushes, slip rings, and relays are covered on Bobcat, Trailblazer, and Legend models.)**
2. Items furnished by Miller, but manufactured by others, such as engines or trade accessories. These items are covered by the manufacturer's warranty, if any.
3. Equipment that has been modified by any party other than Miller, or equipment that has been improperly installed, improperly operated or misused based upon industry standards, or equipment which has not had reasonable and necessary maintenance, or equipment which has been used for operation outside of the specifications for the equipment.

MILLER PRODUCTS ARE INTENDED FOR PURCHASE AND USE BY COMMERCIAL/INDUSTRIAL USERS AND PERSONS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT.

In the event of a warranty claim covered by this warranty, the exclusive remedies shall be, at Miller's option: (1) repair; or (2) replacement; or, where authorized in writing by Miller in appropriate cases, (3) the reasonable cost of repair or replacement at an authorized Miller service station; or (4) payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at customer's risk and expense. Miller's option of repair or replacement will be F.O.B., Factory at Appleton, Wisconsin, or F.O.B. at a Miller authorized service facility as determined by Miller. Therefore no compensation or reimbursement for transportation costs of any kind will be allowed.

TO THE EXTENT PERMITTED BY LAW, THE REMEDIES PROVIDED HEREIN ARE THE SOLE AND EXCLUSIVE REMEDIES. IN NO EVENT SHALL MILLER BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOSS OF PROFIT), WHETHER BASED ON CONTRACT, TORT OR ANY OTHER LEGAL THEORY.

ANY EXPRESS WARRANTY NOT PROVIDED HEREIN AND ANY IMPLIED WARRANTY, GUARANTY OR REPRESENTATION AS TO PERFORMANCE, AND ANY REMEDY FOR BREACH OF CONTRACT TORT OR ANY OTHER LEGAL THEORY WHICH, BUT FOR THIS PROVISION, MIGHT ARISE BY IMPLICATION, OPERATION OF LAW, CUSTOM OF TRADE OR COURSE OF DEALING, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE, WITH RESPECT TO ANY AND ALL EQUIPMENT FURNISHED BY MILLER IS EXCLUDED AND DISCLAIMED BY MILLER.

Some states in the U.S.A. do not allow limitations of how long an implied warranty lasts, or the exclusion of incidental, indirect, special or consequential damages, so the above limitation or exclusion may not apply to you. This warranty provides specific legal rights, and other rights may be available, but may vary from state to state.

In Canada, legislation in some provinces provides for certain additional warranties or remedies other than as stated herein, and to the extent that they may not be waived, the limitations and exclusions set out above may not apply. This Limited Warranty provides specific legal rights, and other rights may be available, but may vary from province to province.

miller\_warr 2008-01





# Owner's Record

Please complete and retain with your personal records.

Model Name

Serial/Style Number

Purchase Date

(Date which equipment was delivered to original customer.)

Distributor

Address

City

State

Zip



## For Service

**Contact a *DISTRIBUTOR* or *SERVICE AGENCY* near you.**

Always provide Model Name and Serial/Style Number.

Contact your Distributor for:

Welding Supplies and Consumables

Options and Accessories

Personal Safety Equipment

Service and Repair

Replacement Parts

Training (Schools, Videos, Books)

Technical Manuals (Servicing Information and Parts)

Circuit Diagrams

Welding Process Handbooks

To locate a Distributor or Service Agency visit  
[www.millerwelds.com](http://www.millerwelds.com) or call 1-800-4-A-Miller

Contact the Delivering Carrier to:

File a claim for loss or damage during shipment.

For assistance in filing or settling claims, contact your distributor and/or equipment manufacturer's Transportation Department.

### Miller Electric Mfg. Co.

An Illinois Tool Works Company  
1635 West Spencer Street  
Appleton, WI 54914 USA

### International Headquarters—USA

USA Phone: 920-735-4505 Auto-Attended  
USA & Canada FAX: 920-735-4134  
International FAX: 920-735-4125

### European Headquarters – United Kingdom

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